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SYMPOSIUM.

TUBERCULOSIS SCHEMES: DEFECTS AND DEFICIENCIES.

TUBERCULOSIS still takes heavy toll. According to the latest available statistics, the number of deaths from tuberculosis in England and Wales was—pulmonary, 29,658; non-pulmonary, 6,160. On December 31, 1931, the number of cases on the registers of notifications kept by medical officers of health amounted to—pulmonary, 236,758; non-pulmonary, 100,763; a total of 337,521. During the past twenty years much progress has been made in the organization and administration of tuberculosis schemes. The initial steps in regard to the general policy to be adopted in the United Kingdom resulted from the recommendations of the Astor Departmental Committee, the final report of which was issued in 1913. This Committee recommended (1) that any scheme which is to form a basis for the control of tuberculosis should be available for the whole community; and (2) that the organization of schemes throughout the country can best be carried out if taken by local authorities. During the course of the years tuberculosis schemes have been elaborated, and their application greatly furthered by the establishment of the Ministry of Health in 1919. Today there are in England 537 approved residential institutions, providing 26,018 beds for tuberculous cases; the corresponding figures for Wales are 16 institutions and 1,405 beds. A complicated scheme is being worked with a large specialized staff and entailing considerable financial outlay. And still tuberculosis prevails, and our measures to prevent and arrest the disease have only limited success. Knowledge regarding tuberculosis is very incomplete, and hence means for conducting a successful combat are restricted. It is not to be wondered at that there are defects and deficiencies in the public health administration of tuberculosis. In view of the existing situation it has seemed expedient to secure the views of a number of tuberculosis experts in regard to existing gaps and flaws.

FROM W. G. SAVAGE,
M.D., B.SC., D.P.H.,
Medical Officer of Health for the County of Somerset.

In a brief statement I confine myself to three points which, in my opinion, are the main administrative defects. (1) One chief defect is that in so many areas no clear decision, with resulting action, appears to have been reached as to the basic object of the existing scheme. Is it in its essentials a non-poor-law form of Public Assistance, or is it pivoted upon the well-recognized principles of preventive medicine? It is evident that many cases of tuberculosis are admitted to sanatoria as a form of Public Assistance when the application of preventive principles would reject them. The early curative case should receive all the sanatorium treatment he needs for a cure (completed outside the sanatorium). The advanced infective case needs institution treatment as a preventive measure Between the two are numerous cases which under most schemes get into sanatoria and for whose admission I can certainly see no justification on a public health basis. It may be advanced that admission to sanatoria limits infection from a tuberculous case, but I do not think this argument can be maintained. An advanced tuberculous case is not cured in a sanatorium, but merely improved, and there will be approximately the same period of infectivity to pass through before the death of the patient : merely deferred infectivity is attained. Any public health advantage from sanatorium treatment as at present generally organized and administered is purely educational and could equally well be obtained by a quite short stay in an institution with instruction as the recognized object. This restricted determination has the further advantage that it is very educative to the medical practitioner who, at least in the early days of the work, frequently provided domiciliary treatment, and then when the case had reached a stage when treatment in a sanatorium was not economically sound suddenly recognized the gravity of the situation and wanted to pass the patient over to the care of the public health authority. The knowledge that such cases would not then be accepted has been a useful stimulus in obtaining cases early. In Somerset we deliberately reject this class of tuberculous subject for sanatorium treatment, and I have always strongly taken the view that the essence of a sound scheme is to pick with great care all sanatorium cases. (2) The legal position (outside county boroughs) definitely encourages the Public Assistance idea and hampers preventive measures. Outside county boroughs, where the two authorities are identical, the authority for providing institutional treatment is the county, the authority for dealing with the prevention of tuberculosis is

the smaller local sanitary authority. Notifications of tuberculosis go to the medical officer of health of the sanitary authority and copies have to be transmitted to the county medical officer of health. If this dual arrangement is interpreted in a legal spirit it makes the counties purely treatment agencies, and what I have called the Public Assistance idea predominates. This dual arrangement is definitely unsound, although it could hardly be prevented without a radical alteration of the respective powers of the two types of authorities. Unfortunately it does, I think, make some counties take a limited view of their functions while still acting within their responsibilities. On the other hand, most counties have interpreted their opportunities more broadly and have made the widest use of the suggestions in the regulations that the two groups of authorities should work in co-operation and have minimized so far as possible the unsatisfactory legal position. In effect they have taken over as much of the preventive work as can be brought within the legal scope and try and supervise the rest of it, thus making their schemes really preventive in operation. While this can be done it yet is an unsatisfactory position, and is one of the cardinal defects of existing administrative arrangements. (3) The failure of early notification is often deplored. One of the best, if not the very best, way to facilitate early notification is to establish firmly the tuberculosis officer as a tuberculosis *expert*. The facile administrative method which makes the assistant medical officers jacks of all medical trades, including tuberculosis, obviously does not breed tuberculosis experts or encourage those pre-notification consultations which so greatly facilitate early notification and co-operation of the practitioner in tuberculosis schemes. In Somerset, where we adopt the experts' attitude, I note that for 1930 the consultations per 100 tuberculosis deaths was 814 compared with 341 for all counties and 334 for England. Holding such views we naturally try to obviate the defects I have enumerated as much as possible in our Somerset scheme whatever others we may have developed.

FROM A. S. M. MACGREGOR,
O.B.E., M.D., D.P.M.,
Medical Officer of Health for the City of Glasgow.

The principal difficulty with which tuberculosis schemes are confronted is that very little headway is being made in the prevention of young adult phthisis, a defect which is mainly conditioned by the natural history of the disease itself. The incidence and severity of phthisis, especially between the ages of fifteen and twenty, have apparently not diminished, and this group presents a serious and difficult clinical and preventive problem. The epidemiology of phthisis

at this age indicates that its solution may be found to lie along immunological lines. Another defect is the continuance of bovine infections and their relation to the milk supplies, about which much has recently been written. Opinion, at any rate in large urban centres, is becoming more and more favourable to pasteurization as a preventive measure. From a public health point of view these are the two principal weaknesses in the tuberculosis movement. Among others there may be mentioned the training of medical students and the tendency to separate instruction in regard to pulmonary tuberculosis from other diseases of the chest. In the application of the principles of prevention, it appears to me that the utmost provision should be made for the hospitalization of advanced cases from small houses: tuberculosis schemes should provide for this to the fullest extent having regard to local conditions.

From SIR PENDRILL VARRIER-JONES,

M.A., M.R.C.P.,
Medical Director, Papworth Village Settlement: Hon. Medical Director, Peamount Village Settlement and Enham Village Centre.

The comparative failure of present measures to reduce drastically the incidence and mortality of tuberculosis is due, in my view, to one prime cause—viz., the lack of efficient aftercare. As I have previously pointed out, we do not send smallpox cases home while they are still infectious; but we frequently do this with tuberculosis cases; and then we expect that the inadequate funds placed at the disposal of the Care Committee will prevent the spread of the disease. In so far as the national tuberculosis scheme includes village settlements it is complete, and I support it wholeheartedly. When it omits them it becomes, in my opinion, incomplete and therefore inadequate. Without village settlements—described officially as "the most valuable piece of aftercare work that has yet been devised"—the national scheme is only capable of dealing with early cases which are so difficult to get because, seeing the awful fate (both economically and medically) of middle and advanced cases, early cases are quite reasonably shy of treatment. Given an adequate system of village settlements the fate of middle and advanced cases would cease to be awful. Early cases would be more willing to accept the treatment, arrest would be more frequent and the incidence and mortality of the disease would be rapidly reduced.

FROM C. H. C. TOUSSAINT,
M.R.C.S., L.R.C.P., D.P.H.,
Deputy Medical Officer of Health and Clinical Tuberculosis Officer,
Metropolitan Borough of Bermondsey.

In any industrial town in England 50 per cent. of the deaths from pulmonary tuberculosis occur within one year of notification. In the whole of England and Wales only 18 per cent. of all cases treated are discharged annually with quiescent disease. These two facts alone reveal the enormous deficiencies in existing tuberculosis schemes, and it must be realized that twenty years have now passed since the institution of compulsory notification. In the first place, the vast majority of students qualify and enter practice without seeing possibly a single case of early infiltration. They are thus unable to detect pulmonary tuberculosis at its onset, and tuberculosis institutions are flooded with advanced cases. Secondly, tuberculosis officers, on whom should rest the responsibility of early diagnosis and of the institution of immediate treatment, are, all too often, denied necessary facilities. Few of them have beds at their disposal. These could be supplied in the municipal hospitals now taken over by the County Councils, and would materially relieve the waiting lists which in themselves are inimical to the success of any tuberculosis scheme. Few dispensaries are equipped with X-ray plants and facilities for the conduct of pneumothorax treatment. To put the position concisely, administration has failed to keep abreast of modern clinical conceptions. Patients must be treated as individuals and not by rule of thumb methods as paper forms. Finally, we need more of an enquiring mind for the many problems of tuberculosis—*e.g.*, epidemiology, the true objects of contact examination, and the advisability of treating early pulmonary tuberculosis as an acute rather than a chronic disease. Too many are content to adopt a policy of *laissez faire* and are possibly afraid of initiating changes which may well give better results at less cost. If every tuberculosis worker would conduct a private "inquest" on each patient, infant or adult, who dies, then we would find ready answers to the questions: How and why do our tuberculosis schemes fail?

FROM G. LISSANT COX,
M.A., M.D., M.R.C.S., L.R C.P.,
Central Tuberculosis Officer for the County Palatine of Lancaster.

The units administering tuberculosis schemes are, in many instances, too small. Urban areas of 300,000 and rural areas of 200,000 can be managed by one whole-time tuberculosis officer with adequate medical and clerical assistance. The abolition of small administrative

units, many with tuberculosis officers doing other work, would justify the establishment of well-equipped dispensaries and enable whole-time specialists to be appointed and remunerated at such a rate as would provide a graded service and make tuberculosis a career instead of at present either a blind alley or a stepping-stone to an administrative post. Many of the small administrative units have insufficient facilities for giving patients—particularly the young adult group—specialized forms of treatment, such as artificial pneumothorax. In too many of the tuberculosis schemes there are separate officers for dispensary work and for sanatorium work. No tuberculosis scheme can be considered satisfactory which does not give its tuberculosis officer control of beds for tuberculous cases. Similarly, the medical staff of a sanatorium should be responsible for some dispensary work in the vicinity of their institution. The tuberculosis officer depends upon the medical practitioner to refer new cases to him. It is essential that medical students should during their training see sufficient patients to obtain an adequate knowledge of the diagnosis, and the difficulties of diagnosis, of early tuberculosis. With certain notable exceptions the present methods of training students in tuberculosis in England are bad, owing to lack of co-ordination between teaching hospitals and the public health service.

FROM H. MORRISTON DAVIES,

M.D., M.CH., F.R.C.S.,

Consulting Surgeon, University College Hospital, London; Medical Superintendent, Vale of Clwyd Sanatorium, Ruthin, North Wales; author of "Surgery of Lung and Pleura."

The results of the surgical treatment of pulmonary tuberculosis are no longer hypothetical. The indisputable facts of the large number of patients who have been greatly benefited or healed by surgery when sanatorium treatment and artificial pneumothorax have failed to arrest the disease is available in the literature of all countries for those who wish to know and to progress. Scepticism of the results can therefore but denote ignorance and indifference. The Welsh National Memorial Association early recognized the important part played by surgery, and equipped their chief sanatoria with every necessary facility. The result is that they have saved the lives and restored to partial or full working capacity innumerable patients otherwise doomed to drift, a burden to themselves and their country, till they die. Why is it that all the counties of England are not equally equipped, so that, when offering their patients treatment, they need not deny a number of them those remedies which may give them their only hope of recovery? A solution to the difficulty of providing a large number of sanatoria

surgeons, assistants, and nursing staffs especially trained, as is necessary, for thoracic surgery, might be solved by the establishment of two or three hospitals in the larger cities of England devoted to the treatment of all diseases of the chest. Each hospital would be connected up with the sanatoria of the adjacent counties. The staff would be advisory to the sanatoria and the hospitals available for the major surgical operations on the cases of pulmonary tuberculosis (as well as other diseases of the lungs) temporarily transferred there for that purpose, and then returned to the sanatoria for convalescence.

FROM ERNEST WARD,
M.D., F.R.C.S.,
Tuberculosis Officer for South Devon; Hon. Secretary, Joint Tuberculosis Council.

Nothing is easier than destructive criticism of tuberculosis schemes, but a wholehearted tribute must be paid to our Ministry of Health, which directs the attack with ability, prescience and tact, and very little publicity. First there are *Defects in carrying out the ordained campaign*: (1) Officers are sometimes appointed, at low salaries, who do not command the respect of the general practitioner. (2) Too much confidence is placed in the therapeutic value of sanatoria and in dispensary work, and there is too little home visiting by the tuberculosis officer. (3) Radiography and artificial pneumothorax are, in some areas, unbelievably neglected. (4) The general practitioner is a most essential unit in all tuberculosis work, and yet, unfortunately, it is still true that there are localities, albeit a small minority, where the chief administrative officer almost jealously prevents the cordial contact which should prevail between tuberculosis officer and general practitioner. Initiative from the tuberculosis officer is sometimes sternly, sometimes quietly, discouraged; improvements not suggested by headquarters have little chance of trial. Then there are *Defects in the ordained campaign itself*: (1) Tuberculosis from bovine sources should not occur. Universal pasteurization pending the gradual detuberculization of our dairy herds is the ideal but is not at present practicable. We should stop bickering about hypothetical injury to vitamins, and advocate a practical procedure—the universal bringing to boiling-point of all milk destined for human consumption. (2) More could be done towards the discovery of unsuspected cases with the co-operation of practitioners. (3) And then we must make up our minds as to further measures for more efficient prevention. To this end a useful preliminary step would be an investigation of the exact happenings to the families of colonists living under the ideal conditions provided at

Papworth and Preston Hall Settlements. It is said that no tuberculosis among contacts has ever occurred at Papworth, and this might well provide the basis for wider preventive measures. Let me conclude with a cheering remark made by a London pathologist: "From post-mortem findings there is no doubt that pulmonary tuberculosis is less universal today than it was fifteen years ago."

FROM G. T. HEBERT,
M.D., F.R.C.P.,
Physician-in charge of the Tuberculosis Department, St. Thomas's Hospital, London.

An experience of some sixteen years of tuberculosis dispensary work in London has convinced me that the London County Council's scheme is a good one, but, as in all other schemes, there are certain defects and deficiencies resulting from (1) financial, (2) medical, (3) geographical, and (4) local and general administrative difficulties. (1) *Financial difficulties:* If more money were available, improvements could be made in several directions, particularly that of X-ray examination. If his dispensary were equipped with a modern X-ray plant, the tuberculosis officer could soon acquire sufficient skill in technique and in the reading of radiograms. (2) *Medical difficulties:* (*a*) The main defect of existing tuberculosis schemes is the lack of an adequate plan for prevention. (*b*) Too few tuberculosis officers receive post-graduate instruction It is true that there are a few courses each year, but the tuberculosis officer often has difficulty in attending them. (3) *Geographical difficulties:* If the tuberculosis officer could follow the treatment of his cases at the sanatorium, he could deal with them much more effectively afterwards. (4) *Local and general administrative difficulties:* (*a*) The tuberculosis officer should have observation beds, and a better personal acquaintance with the local general practitioners than is usually the case. (*b*) The tuberculosis officer must spend a great deal of time on his records if he hopes to make his figures for the annual return balance. Personally I do not think that the annual return is a good guide to the efficiency or the reverse of a dispensary. (*c*) The central authority does not appear to place sufficient confidence in the diagnosis and judgment of the tuberculosis officer when there is a conflict of opinion between him and the out-patient physician of a general hospital or the resident medical officer of a chest hospital. Each of the latter has a much less extensive experience of tuberculosis.

FROM F. G. CHANDLER,

M.A., M.D., F.R.C.P.,

Physician with Charge of Out-Patients, St. Bartholomew's Hospital; Physician, City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.

In response to the Editor's request to comment on the defects and deficiencies in existing tuberculosis schemes, I would venture to make the following criticisms: (1) The failure to educate the profession in diagnosis. (2) Failure of diagnosis in some of the dispensaries themselves, because all the tests are not applied, or not applied adequately—*e.g.*, repeated sputum tests, or tests of the fæces in the absence of sputum, a temperature record, and X-ray examination. (3) The frequent long delay in admitting patients to county sanatoria. (4) Difficulty of placing patients who have combined surgical and medical tuberculosis—*e.g.*, phthisis and caries of the spine. (5) The lack of suitable accommodation for the advanced case. (6) The possibility of county tuberculosis officers exploiting their idiosyncrasies—*e.g.*, one county tuberculosis officer does not believe in artificial pneumothorax treatment; therefore such treatment is not officially given in that county.

FROM J. MIDDLETON MARTIN,

B.A., M.D., D.P.H.,

County Medical Officer for Gloucestershire County Council.

It is desirable in all affairs of life to take stock of the situation from time to time, and the jubilee of Koch's discovery of the tubercle bacillus is an appropriate occasion for considering our tuberculosis schemes. That they have not fulfilled all the aims of the promoters is now generally admitted: the average duration of life of persons who have passed through a sanatorium is not appreciably different from that of those who have not had that advantage, and the fall in the incidence of tuberculosis in the community as a whole has not been accelerated by our special activities. At the same time, it is probably not too much to claim that as a result of these special activities there has been a greater stimulus in the general promotion of conditions of healthy living than would otherwise have been achieved, and that one of the results is that the conditions of life and work have been improved in the past twenty years far more rapidly than in any period. These benefits have been obtained through the attention drawn to the ravages of a particular disease, and it would appear that the time has arrived for a recognition of the fact that it is only a part of the general problem of healthy living, and for the application of our tuberculosis machinery to much more general conditions of ill-health. Though unrecognizable by

our present methods of examination as being due to early tuberculous trouble, *e.g.*, the vague pyrexial troubles of childhood may be due to that condition, and, in any event, measures for improving nutrition will be beneficial whether the cause is tuberculous or not. It is suggested that fundamental defects in our present schemes include: (1) Failure to recognize in practice the impossibility of detecting, by signs, really early infection. (2) The consequent failure to provide special care before there is extensive damage to tissues. (3) The necessity of "notification" (with the disadvantage of labelling which it entails) before individuals can be given the benefit of special treatment. (4) Very little has been effected in the way of prevention, which must include everything which makes for healthy living, and special protection in the earliest possible period of life when our knowledge is sufficient for direct action.

FROM H. C. ELDER,

M B., M.R.C.P., D.P.H.,

Tuberculosis Officer for Edinburgh.

In considering especially the pulmonary manifestations of tuberculosis, it must be confessed that in routine dispensary work still too many cases report for the first time showing evidence of advanced or moderately advanced disease. This is not always the fault of the patient. Considerable improvement could be effected in this connection by affording facilities to the general practitioners of the area to attend the dispensary clinics at convenient sessions, so that opportunities could be extended to them for further experience in diagnostic technique. The existing conditions relating to "contact" survey are far from satisfactory. At present the "contact," if proof against moral suasion, remains secure in his insecurity. To overcome this obvious defect, examination of contacts should be made compulsory, and in doubtful cases attendance at the dispensary for complete X-ray investigation should be enforced. Facilities should be extended to the tuberculosis officer for the routine tuberculin testing of the school children within his area, especially those from known infected homes. For some time regulations have been in force in Edinburgh for the compulsory examination by the tuberculosis officer of all applicants for apprenticeship to the printing and allied trades, and it is felt that benefit would accrue from an extension of these regulations to other trades. The absence of powers to retain advanced cases in hospital is a discouraging feature, and in such cases reason, and not sentiment, should be made to prevail. The preventorium for the reception of appropriate cases fills a long-felt want, and should constitute a part of

every anti-tuberculosis scheme. Realizing the amount of disease and deformity which is directly due to the consumption of milk infected with the bovine tubercle bacillus, the time has now surely come when every local authority should insist, as part of their anti-tuberculosis campaign, on the efficient pasteurization of all milk sold within its area.

FROM A. P. FORD,

M.R.C.S., L.R.C.P., D.P.H.,

Deputy County Medical Officer of Health and Tuberculosis Officer, Hertfordshire.

Those of us whose work is clinical rather than administrative are liable to forget that the chief function of public health tuberculosis schemes is to prevent the spread of the disease. Until a definite conclusion is reached regarding the method of infection, it is not possible to regard existing tuberculosis schemes as free from defects and deficiencies, and it would appear that the next step towards perfecting such schemes would be to carry out some intensive research towards ascertaining whether the cause of pulmonary tuberculosis is exogenous or endogenous in character. There is still room for considerable improvement in the notification of early cases of tuberculous disease. And in regard to so-called "domiciliary treatment" as frequently carried out there is also much to be desired. The continuation of artificial pneumothorax refills, when the patient is transferred from one area to another, is often difficult to arrange, as there are still some authorities who do not make any adequate provision for carrying out collapse-therapy. In view of the difficulty in obtaining beds for such cases, unless several new institutions are provided, it will probably become necessary for public sanatoria to undertake the treatment of surgical tuberculosis in adults. If this latter course be adopted, each sanatorium will have to be provided with a properly equipped operating theatre, and a visiting surgeon must be added to the staff. This latter point is also of importance in view of the fact that surgical treatment of pulmonary tuberculosis is growing rapidly in importance.

FROM HILARY ROCHE,

M.D., M.R.C.P.,

Tuberculous Diseases Diploma of University of Wales; Medical Superintendent of Montana Hall, the British Sanatorium, Montana, Switzerland.

In response to the Editor's request for an enumeration of what I consider the chief defects and deficiencies in the existing tuberculosis schemes, I should like to submit the following: (1) The absence of means whereby the universal and efficient pasteurization

of milk could be enforced. (2) A lack in many medical schools of adequate instruction of medical students regarding the recognition and treatment of pulmonary tuberculosis. (3) Insufficient propaganda among general medical practitioners, particularly in relation to essentials of the early diagnosis of pulmonary tuberculosis. (4) The want of adequate facilities for regular post-graduate study, both in Great Britain and abroad, for all medical officers in the tuberculosis services. (5) A deficiency in the number of institutions for patients who have failed to respond to sanatorium treatment. (6) A scarcity of colonies and village settlements for tuberculous subjects. (7) The lack of sufficiently powerful X-ray plants in many diagnostic and treatment centres.

FROM S. LYLE CUMMINS,

C.B., C.M.G., M.D.,

Professor of Tuberculosis, Welsh National School of Medicine, Cardiff.

Existing tuberculosis schemes appear to the writer to be, on the whole, very efficient, and to be steadily improving. The Editor's intention, however, is that we should stress not the qualities but the defects of existing tuberculosis schemes, and so it is necessary to be critical rather than laudatory. The main faults appear to the writer to be as follows: Too exclusive attention is paid at present to the treatment of clinically tuberculous adults; too little to that of infected but healthy children. The latter are the potential cases of the future, and want special watching. Insufficient attention is given to the homes where dwell tuberculous persons. Every such home is a potential source of infection to others unless special precautions are enforced. The kind of precautions necessary are those which are actually carried out in Papworth Village Settlement, where there is constant medical supervision of the homes of the village population. There is not nearly enough amalgamation amongst local authorities for the provision of large, efficient, and well-endowed tuberculosis services. Part-time work, ill-paid officers, insufficient staff, absence of X-ray facilities, and difficulty of access to bacteriological laboratories constitute the gravest defects in some of our smaller organizations. Local authorities must remember the old adage: "United we stand, divided we fall."

FROM BERNARD HUDSON,
M.A., M.D., M.R.C.P.,
Swiss Federal Diploma, Medical Superintendent of the Victoria Sanatorium, Davos Platz.

In my opinion one of the most serious deficiencies in the problem of dealing with tuberculosis, and I refer especially to tuberculosis of the lungs, is the lack of adequate instruction, regarding this disease, in the big general teaching hospitals. This omission to teach essentials respecting this particular complaint exists not only in England, but also in continental countries. Tuberculous disease of the lungs is, I suppose, the commonest chronic malady that exists, and in many instances is ultimately a fatal one. In all cases, even those in whom the best possible results have been obtained as regards recovery, there inevitably remains a delicacy of health which handicaps the individual concerned very seriously in his powers of following employment and earning a living. The medical student of today can become qualified and be enabled to practise amongst his fellow creatures without having had adequate opportunities of really learning practically about this disease, which by general consent is recognized as the commonest and most fatal scourge of the world. The importance of proper teaching cannot be overestimated. Early diagnosis is required for effective treatment. Every medical student should be taught to realize the seriousness of the disease, however slight—its early developments, the importance of prompt and proper treatment applied without delay, and the application, especially in early unilateral cases, of such surgical means as are now at our disposal when such a line of action is indicated. By this I refer especially to the production of artificial pneumothorax. I suggest, therefore, that more importance should be given to instruction in tuberculosis in all teaching hospitals, and every student should be required to attend a course at a special tuberculosis hospital or sanatorium.

ORIGINAL ARTICLES.

TUBERCULOSIS AND TEMPERAMENT.

By K. H. R. EDWARDS,
M.ED., B.SC.,
From the Psychological Laboratory, Cambridge.

It is a matter of common observation that certain diseases such as tuberculosis exert distinct, and often well-marked, effects on the mentality of their victims One may explain this by supposing that every functional disorder or organic lesion of a particular part has its corresponding mental condition, the inference being that each disease has its peculiar psychological coefficient.

The Mental Changes of Tuberculosis.

Tuberculosis has been represented diagrammatically by a circle divided into three arcs, the first representing physical features, the second mental, and the third chemical, the whole forming one continuous line. The mental changes occasioned by this disease, excluding tuberculous meningitis, are not, predominantly, those affecting cognitive processes, since individuals throughout the course of the disease appear to retain generally their intellectual abilities. The mental changes seem, however, to reveal themselves as alterations in temperament, personality and character. The two principal morbid processes at work in tuberculosis occasioning these psychical changes are, according to Gubb,[1] firstly, changes in mental temperament, presumably due to the action on the nervous system of the toxins elaborated by the tubercle bacilli; secondly, modifications of character due to mechanical interference with the cerebral functions resulting from the deposit of tubercle within or upon the brain. Deviations in character, caused in this latter way, seem to be similar, at least in expression, to those consequent upon encephalitis lethargica.

With regard to the effects of toxic processes, since individuals differ widely in temperament, the differences in types being due to and explained through individual differences in endocrine systems according to Berman[2] and others, it might be expected that the effect of the toxæmia would vary widely from person to person and probably in accordance with the disturbance of the glandular system as a whole. The problem is interesting but of great complexity. Not only do individuals in comparable stages of similar types of this disease reveal

wide variations in the amount of toxæmia present, but also the effects of the toxæmia on individuals differ remarkably and in the same individual from time to time. To what extent this is due to differences in glandular systems is a matter, as yet, for conjecture. In any case, these differences in effects caused by the toxæmia seem to be differences, principally, of degree.

Temperamental Traits.

The average tuberculous person tends to show some temperamental characteristics in common with other tuberculous persons. Muhl,[3] finds that tuberculous women showed the following common traits: Inertia, fatigability, oscillating mood, perseveration, anger, irritability, converted sex trends in the form of masochism or sadism, suggestibility, restlessness, apprehensiveness, hypersensitiveness, depression, regressive trends, loss of interest, memory impairment and ambition. The tuberculosis medical officer could, without difficulty, confirm these observations or substitute other traits equally well known to him.

The actual order of presentation of these and other traits seems to vary. In many cases, commencing phthisis appears to find expression, as in other diseases, prior to the revelation of any observable physical sign, in changes of a psychical nature. These signs possess, to some degree, prognostic value. Their manifestation alters, as may be expected, with the course of the disease, but, as yet, one can neither assume any definite correlation between the revealed degree of particular traits and the disease process, nor between the degree of toxæmia present and the course of the disease.

Two hypotheses may be advanced to explain the incidence of certain common temperamental qualities among tuberculous people. The first is that there occurs a definite alteration in the expression of a person's innate qualities caused by the disease, which in this manner reduces originally distinct temperaments to a common range and level. The second hypothesis is that the qualities shown represent the ordinary temperaments of the persons concerned. The first presupposes some alteration of the basic temperament by the disease and the second none at all.

Experimental Investigation.

In an endeavour to throw light on this problem, an investigation with a group of tuberculous children was recently carried out at the Tuberculosis Dispensary, Middlesbrough, through the courtesy of Dr. C. V. Dingle, Medical Officer of Health, and Dr. F. J. Henry, Tuberculosis Officer, to whom my cordial thanks are due. A group of twenty children in attendance at the clinic, selected by Dr. Henry, were given a number of psychological tests designed to ascertain their temperamental qualities. The tests used are described in the *British*

Journal of Psychology.[4] These tests were also given to a control group of normal childen, the latter group being chosen so that the two groups were comparable in age and sex. As a check on the experimental results, supplementary ratings on the qualities examined were obtained from the parents in the first group and from the children's teachers in the second group. The Coefficient of Contingency * between the Parents' Ratings and Test Ratings was 0·37, that between the Teachers' Ratings and the Test Ratings was 0·55. Both these coefficients are what is statistically described as "significant." This is evidence that the test scores experimentally obtained did tend to agree with the supplementary ratings.

Comparing the test gradings of the tuberculous children with the test gradings of the normal children, the differences between the two groups as demonstrated in this way are as follows: The former children appear to show increased nervousness and irritability, poor accuracy of movement, average to slow speed of movement, poor planning ability, high restlessness, poor self-confidence, poor virility, little recklessness, marked sluggishness and lack of tenacity of purpose. They were also found to be more suggestible than the group of ordinary children. It may be added that the so-called cheerful sanguinity of tuberculous people rarely appears in childhood, when those affected seem to be more often moody, depressed and irritable. Some of these characteristics are probably well known to all who have to do with tuberculous children. But it might be reasonably argued that the differences here demonstrated may have been due to the operation of chance factors during the investigation. Careful statistical analysis shows otherwise; the probability that these differences between the groups occurred as a matter of chance is only 9 in 100, so the results were, from this point of view, significant.

In the course of the testing the heterogeneous character of the selected group became very apparent, and it became possible to subdivide the larger group into smaller groups purely on the basis of psychological attributes shown. The first sub-group contained the majority of the children who revealed most of the above-named qualities, the second sub-group of children compared very favourably with normal children, while the third smaller group seem to elude classification and description. Upon reference being made to the clinical histories, which had so far purposely not been consulted, it appeared that, very broadly, the first group was composed of "active pulmonary" cases, the second group of "arrested cases" of a pulmonary type, whilst the third group were pulmonary cases in whom the disease had been checked over a

* A coefficient of contingency is a coefficient expressing the relationship between two variables when these are stated, not in definite marks, but in grades. See any text-book on statistics.

period and were regarded as "quiescent." These children in whom the disease process was quiescent differed remarkably from those in the other two sub-groups and were exceedingly difficult to analyze in any way. They revealed no outstanding characterological traits and were temperamentally colourless. Their parents confirmed these observations. To explain this the view is put forward that the quiescent stage of the disease may be accompanied by a corresponding quiescent stage of temperamental expression. A similar investigation, carried out on a smaller scale at the Cambridge Tuberculosis Dispensary with the co-operation of the Tuberculosis Officer, Dr. W. Paton Philip, confirmed these observations.

Whilst the size of the group investigated was small and few exact and definite conclusions may be drawn, yet it would appear that sufficient evidence was available to show that children suffering from the pulmonary type of the disease do show a certain range of temperamental qualities. These, as revealed in a pattern, do not so much represent magnifications of previously existing temperamental patterns as they represent marked deviations from the original temperaments caused by the disease. The first hypothesis would seem the more likely. This conclusion is based on the evidence that, whilst a characteristic stamp is shown by "active" tuberculous cases, in the quiescent stage of the disease, resulting from careful treatment, there appears a peculiar temperamental colourlessness. Were there present only magnifications of the existing trends, this stage would not appear, since the slow return to almost normal health would be accompanied inevitably by the increasing manifestation of existing traits. The children would never in this case show a period of psychological colourlessness.

Some Inferences.

If the quiescent stage of the tuberculous disease is assumed to be accompanied by a quiescent stage of temperamental expression, on this hypothesis we have one temperamental expression in this disease: a period of colourlessness in the quiescent period followed by the later emergence of the almost normal temperament. It must not be presumed that it is the basic temperament that alters. It is merely the expression of that temperament which deviates, for, since temperament shows itself in and through the nervous system, its expression is capable of wide variation when the nervous system is affected. The nervous system being extremely sensitive to disease processes, alteration in temperamental expression is more than likely. Gubb[1] states that in tuberculosis, during the period of invasion, a tendency to refinement is noticeable. Mauclaire explains Watteau's transcendental delicacy of perception as being due to the intoxication of the nervous processes. It is easy to quote numerous men of eminence, such as Verlaine,

Schubert and Chopin, whose death from pulmonary tuberculosis was preceded by a remarkable development of their talents to previously unattained brilliance. To account for this, the theory of efflorescent genius resulting from disease processes is usually advanced. Practical supporting evidence is hard to find. Medical attendants diligently seek, but fail to discover, such cases in our village settlements and sanatoria. This may be due to the fact that this brilliance is to be explained, not in purely cognitive changes, but rather in refinements of temperament. In the first place, one must postulate a peculiarly sensitive temperament, which unfortunately is all too rare. Intoxication, then, would cause a still further increased sensitivity and refinement through the whole nervous system. More delicate thresholds would produce keener sensations and fuller perceptions. The existing well-organized intellect would then be able, with the aid of a more creative imagination, to deal with ordinary materials in a still more brilliant way.

Few generalizations can be drawn from this type of argument, for the effect of intoxication upon individuals, as previously mentioned, is remarkably variable. In some, slight intoxication has pronounced effects, in others severe toxæmia yields hardly discernible symptoms. If the alteration of temperamental expression by disease is accepted, it follows that the possibility of alteration by means of treatment must also be considered. One case illustrating this has come to my notice. An entire change of personality was effected through the course of treatment for tuberculosis. A refined cultured man became coarse, common and boorish. Such changes possibly have glandular origins. How close to the original temperament the expressions which accompany the disease treatment return is an interesting question. It may be shown that most individuals, even in an "arrested" stage, do not reveal the precise temperamental pattern they showed prior to the incidence of the disease.

General Conclusions.

It is not possible to draw reliable and valid conclusions from a single investigation such as this with such a small number of subjects. But one or two points of general interest have arisen. There is some evidence to show that differences in temperamental expression occur between a group of tuberculous children and a presumably normal group of children. In active instances of the pulmonary type of disease, the existence of a common range of traits often appears, the actual manifestation of these seeming to vary with the degree of healing of the disease process. A modification of the temperamental expression by disease is suggested as occurring. This falls in line with Miss Bloor's concept of temperament as a fluctuating phenomenon.[5]

The criticism may be applied to this work that the children in the tuberculous group may have shown alteration in temperamental expression, but that these are merely caused by the fact of illness, and will be shown by any children not in sound health.

Whilst it is agreed that a part of the modification to temperamental expression shown will occur through this cause, yet it is held that such changes would possibly accentuate existing temperamental differences, and that the presence of common qualities seems to be evidence against this criticism. But before light can be thrown on these and similar problems, it will be necessary to have other valid tests to measure these differences more accurately. By taking a normal group, a group of unhealthy children, a tuberculous group, and so on, it will then be possible to secure more reliable evidence and to prove or disprove the issues here raised.

A related problem is the question of the existence of psychological types which are predisposed to disease. To this baffling question much attention has already been paid. At present there exists a vicious circle. Certain types are predisposed to disease, according to many writers, whilst recent work of the typological psychologists seems to show that this disease actually produces marked psychological types. One comment may be added. It may eventually be found that the existence of certain mental characteristics in persons which are taken to denote a predisposition towards a specific disease will be actually explicable in the fact that these signs are actually the result of disease processes already at work in the individual.

A final point of practical interest emerges. The difficulty of accurate diagnosis in the childhood type of tuberculosis is accepted as being fairly considerable. Occasionally grave doubt from the history and appearance of symptoms as to the presence of tubercle exists. X-ray and other examinations may be negative, the lungs apparently perfectly clear, yet the disease is present. On the other hand, obvious symptoms which appear may be occasioned by other disease processes and not by tuberculosis. The similarity of certain types of chronic dyspepsia in children to early tubercle infection has often been pointed out. In such cases it would seem that a thorough psychological examination of the individual would be extremely valuable. This supposes, of course, a considerable degree of advance in the exploration of the purely psychological aspects of this and other diseases. This will undoubtedly take place, and the medical officer then will use psychological methods, not only in the course of treatment of this disease, but also in its diagnosis.

Summary.

1. Mental changes in tuberculosis relate principally to temperament and character. Tuberculous people are said to show a common range

of traits. These may represent either normal temperaments or alterations of original temperaments occasioned by toxæmia or other causes.

2. Experimental investigation confirmed the existence of a common range of traits in tuberculous children. Differences in traits as revealed by different clinical types were noticed. Quiescence of the disease process seemed to be accompanied by quiescence in temperamental expression.

3. The common traits revealed represent deviations from ordinary temperaments caused by the disease. Temperamental expression is thus capable of being affected by lesions, probably through the nervous system.

4. Lack of evidence to verify the theory of efflorescent genius in tuberculous cases exists. Possibly this phthisical genius is a matter, not of cognitive changes, but of temperamental changes. A peculiarly refined temperament must be postulated. This is all too rare.

5. The psychological effects of tuberculosis possess prognostic value. When they become further determined, they will provide a valuable aid to diagnosis.

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THE TREATMENT OF PULMONARY TUBERCULOSIS BY LIGHT: PHASES OF THE CONTROVERSY.

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WE are apt to think that the treatment of pulmonary tuberculosis by sunlight, natural or artificial, is a post-war method, borne upon the wave of indiscriminate actinotherapy which followed the successful use of the method in rickets and surgical tuberculosis. Such, however, is not the case. In 1902 Kayser of Vienna first used artificial light treatment for pulmonary tuberculosis. Using arc lamps he obtained good results, which received no attention at the time. Malgat of Nice

used natural heliotherapy for these cases in 1904, and Brecke in 1913 reported good results, especially in tuberculous pleurisy. Bach in 1911 investigated the effect of artificial sunlight upon the blood pressure of patients with pulmonary tuberculosis.

Most of this work has been done on the Continent and in America. In Britain the fear of hæmoptysis and other dangers has prevented many careful observers from giving the method an extensive trial. What is more important, even yet agreement has not been reached as to the selection of suitable cases.

General Summary of Early Work on Light Treatment of Pulmonary Tuberculosis.

Krüger[1] in 1912 began the treatment of thirty-one cases of pulmonary tuberculosis by actinotherapy. Treatment was carried out for fifteen months. Two patients died, but Krüger stated that many of the others were improved, and he noted a gain in weight in most. His results were generally considered as optimistic.

Bacmeister[2] in 1912 treated many cases, and claimed that there had been in most an increase in weight, together with a diminution of the temperature and a disappearance of restlessness and fatigue. He later recommended the combination of light treatment with X-ray treatment, especially in proliferative tuberculosis, but few would now be inclined to recommend this method.

Gutstein[3] made a careful study of over 40 cases, and 28 of these were reported in detail. He used a Bach lamp, and general exposures to the back and chest were given. Treatment was started with an exposure of three minutes at 40 inches, and was increased gradually to one and a half hours each, back and front, at 24 inches. The results in the 28 cases were as follows: In 6 the cough had totally disappeared; in 6 it was much diminished; in 11 it was slightly diminished; 4 cases were unimproved; and 1 case was considered worse. A reduction of the temperature was noticed in 7 cases, and in most an increase of weight was found. In 6 cases tubercle bacilli were absent from the sputum at the end of treatment. In 17 cases there was a clinical improvement in the lung condition; the other cases showed no change. Gutstein concluded that the treatment was valuable in selected cases, but he was emphatic that any good effects obtained were not specific.

Dangers associated with Treatment by Actinotherapy.

Disagreement as to the importance of the ill-effects which may follow treatment of pulmonary tuberculosis by actinotherapy is one of the factors which has prevented any definite conclusions being reached. Weinbren[4] enumerated these dangers thus: (*a*) Hæmoptysis;

(*b*) re-activation of quiescent disease; (*c*) danger of disseminating infection; (*d*) danger of focal reactions. These we may consider separately.

(*a*) *Hæmoptysis.*—In a series of 130 cases Weinbren did not see a single instance of hæmoptysis the cause of which he could definitely attribute to the light treatment. Crocket[5] saw hæmoptysis in four patients in a series of seventy-two cases. He notes that this number would probably have occurred naturally, a point which is apt to be overlooked by critics of the method. Wood[6] in a small series did not have a single case of hæmoptysis. Kirkwood[7] concluded that, if artificial light treatment was properly administered, it did not predispose to hæmorrhage. Gähwyler[8] states that a tendency to hæmorrhage is a contra-indication, but he does not say how many hæmorrhages he has seen during the course of ultra-violet ray therapy. O'Brien[9] says that hæmoptysis is *not* a contra-indication. Rollier,[10] writing on the use of natural sunlight, says that, if carefully carried out, heliotherapy may even decrease the tendency to hæmoptysis, and Holmboe goes so far as to say that heliotherapy will prevent hæmorrhage. It has been recently suggested that, when hæmorrhage has occurred with natural heliotherapy, it has probably been due to the action of the infra-red rays; quartz light is poor in heat rays, and, theoretically, there should be little tendency to hæmorrhage in selected cases.[11] Rickmann[12] concluded that the injudicious use of ultra-violet therapy may cause pulmonary hæmorrhage.

(*b*) *Danger of Re-activation of Quiescent Disease.*—Weinbren points out that from 10 per cent. (Gauvain) to 20 per cent. (Rollier) of all cases of surgical tuberculosis have inactive pulmonary disease in addition to the local lesion. These surgical cases seldom develop active pulmonary tuberculosis while they are receiving light therapy. On the other hand, Kayser-Petersen[13] reported a case in which artificial light treatment "caused" rapid extension of an apical infiltration. Since, however, he did not give the treatment himself, and since no particulars are given regarding dosage, the report is not of much value. In any case, too much weight must not be put upon reports of isolated cases, especially if these cases have not been specially selected for the method.

(*c*) *Danger of Disseminating the Infection.*—Many writers have stressed the likelihood that cavities will become larger, and that the lesions generally may extend, under this form of treatment. Weinbren answers this argument by stating that extension will always be accompanied by toxæmia, which is itself an indication that treatment should be discontinued. But Gerstenberger and Burhans[14] have used the treatment on cases in which cavities developed, apparently no harm being caused thereby. In their paper the X-ray plates are reproduced, and the appearances are certainly very suggestive of cavitation.

(*d*) *Danger of Focal Reactions.*—In cases which do not show marked activity this result should not occur. Burrell[15] says that ultra-violet ray treatment may cause a shock similar to that produced by tuberculin; but he thinks that in certain cases this may even be beneficial, once the patient has recovered from the preliminary reaction.

From the literature it would appear that the ill-effects which may follow the treatment have been exaggerated. This is especially the case when the patients have been carefully selected for the treatment.

Methods of Treatment and Technique.

Heliotherapy.—Rollier, the pioneer of this mode of treatment, devised a fractional method of insolation which has been largely used by others, especially in Switzerland and in America. Rollier, in his book, "La Cure de Soleil," gives details. LoGrasso and Balderrey[16] modified the method slightly. They reported on forty-nine cases, and the results were apparently good. Wood[6] commenced with fractional insolation in the shade, and increased the time and area irradiated rapidly until the whole body was being insolated. Full sunlight was then used. Kisch[17] gives a very complete table illustrating his method, which in the main resembles Rollier's. Crocket points out that it is unnecessary in this country to adopt the full Rollier scheme, but Eberson[18] thinks that the Rollier method gives better results than any of the modifications which have been suggested. In most parts of this country heliotherapy has very definite limitations, and the method need not be further considered here.

Arc Lamps.—Weinbren[4] employs these agents. For out-patients he commences actinotherapy at 4 feet with an exposure of three or four minutes; this is gradually increased to thirty minutes, and each dose is repeated once before the time is increased. Out-patients are treated three times a week, and in-patients five times a week. Würtzen[19] employs three 20-amp. carbon-arc lamps at $\frac{1}{4}$ metre, or, alternatively, larger lamps at $\frac{1}{2}$-metre distance. He begins with thirty minutes in afebrile cases. The doses are larger and the distances shorter than those generally used in this country.

Quartz Lamps.—Nearly all Continental workers use either the Alpine sun (Bach) lamp or the Jesionek lamp, and their use in this country and in America is also very general. O'Brien[9] commenced with an exposure of two minutes each, back and front; the exposures were gradually increased to thirty minutes. This technique follows broadly that usually employed. Carl Sonne mentioned that the fractional method was not essential; but it was necessary to take the temperature reading both before and after treatment. Bach rightly points out that no standard dosage can be laid down, since this must depend upon the individual patient.

The question as to whether it is desirable that the patient should pigment is a wide one, and cannot be discussed here. Much has been written on this subject. O'Brien, in pulmonary work, thinks that there is no advantage in the production of erythema, and that a gradual tanning is not necessary. In any case the production of pigmentation is not nearly so common as a result of quartz-lamp treatment as it is after exposure to natural sunlight.

Most writers agree that in all pulmonary cases the patients should be carefully watched for the onset of any signs of a reaction. Sonne stated that a rise of temperature was frequent after natural heliotherapy; this was probably due to the luminous rays, which were more plentiful than in the light from quartz lamps. He stated that the temperature should not rise more than a degree after treatment. Paschetta,[20] from the study of 1,500 cases, divided the temperature reactions following irradiation into four groups; if the temperature rose more than a degree (centigrade), and if this rise was succeeded only by a slight fall, he considered that irradiation should be discontinued.

Especial interest is attached to the method employed by one of the most recent writers on the subject. Sepke[21] employed six Jesionek lamps, arranged in a circle, and alternating with six Sollux radiant heat lamps. The patients walked around the lamps at a distance of about 1 metre from them. It would appear that treatment was commenced with exposures of two minutes; these were increased by two minutes at each exposure until a maximum of eight minutes was reached.

Many writers comment upon the undesirability of irradiating the chest, but it is difficult to understand why this should be a dangerous practice. The depth to which penetration of ultra-violet rays takes place is merely a fraction of an inch, and the rays cannot reach the underlying lung. In natural heliotherapy the question is different, since sudden exposure of the chest to the atmosphere may cause chest symptoms.

Selection of Cases of Pulmonary Tuberculosis for Light Treatment.

Indications.—The indications as given by different writers vary considerably. Bach[22] admits that in the progressive, exudative, and destructive stages of pulmonary tuberculosis the treatment is useless, but he thinks that even in these the irradiation has a favourable effect upon the perspiration and the sense of exhaustion. He thinks that in all other cases the treatment may be given with the expectation of good results. Few in this country will agree with these statements. Weinbren[4] says that the extent of lung involvement is not a safe guide. Treatment may be safely given provided that there is little evidence of breaking-down of lung tissue. Clinically there may be an evening tem-

perature of 99·5° or 100°; slight dyspnœa and sweating may be present, and the patient may have a little sputum. Kirkwood[7] says that the treatment can be used safely, and usually to advantage, in any fibroid or nodose pulmonary lesion which shows little or no "activity," where X-ray examination shows little or no perifocal reaction, and which is not complicated by arterio-sclerosis, hypertension, or uncompensated cardiac disease. Rollier[23] notes that with natural heliotherapy the post-pleuritic and fibroid types derive most benefit from treatment, especially if they are complications of surgical tuberculosis. Cooper[24] and Laird[25] both thought that heliotherapy was of most use in cases which showed a tendency to fibrosis. Gähwyler[8] gave the following indications: All purely fibrous cases; indolent dry pleurisy; congestion of the pulmonary circulation in chronic cases.

Contra-indications.—Crocket[5] gives the following: (*a*) Cases of progressive disease anywhere; (*b*) cases showing marked and progressive tissue destruction; (*c*) cases with toxic manifestations—*e.g.*, amyloid disease or cachexia; (*d*) cases which show pyrexia due to sepsis; (*e*) cases of hyperthyroidism. Weinbren is emphatic that not the extent of the disease but the state of activity is the guide, and that there is no single contra-indicating factor if the cases are selected on these lines. A high degree of toxæmia is probably the most suggestive factor. Laird thinks that the treatment is very little more dangerous in active cases than in the afebrile cases for which he recommends it, but he admits that in acute cases the treatment is not likely to prove of much value. Gähwyler gives the following contra-indications: Exudative pulmonary processes; all pneumonic and broncho-pneumonic cases; high fever; a tendency to hæmorrhage; all cases which are inclined to be progressive, and which show a rise of temperature after the slightest irritation; all cases with toxic manifestations, intestinal or cardiac. Würtzen of Copenhagen holds views which are much opposed to any of the above. He says that there are no contra-indications to this form of treatment; it is all a question of dosage. In his cases the treatment is abandoned only when the patient is too ill to go to the light room.

General Results of Light Treatment in Pulmonary Tuberculosis.

Würtzen has used light treatment extensively, and he affirms that it produces a greater improvement in the general condition than is found in patients not treated by light; there is also a parallel improvement in the objective findings. He admits that the results are not so obvious as in cases of tuberculosis of the bones and joints, but they are so definite that this form of treatment is now widely used in Denmark. He notes that the method must be considered as an adjuvant to other forms of treatment. O'Brien noticed a marked decrease in lung mois-

ture, and a diminution in the severity of the cough. Weinbren's impression is that weight is gained, the temperature becomes normal, and the sputum becomes negative and remains negative. Crocket's conclusions, based upon a series of seventy-two cases, were : The general condition and the material outlook were improved. Fewer adventitious sounds were heard in the chest. Cough was relieved in 82 per cent. of cases. In 54 per cent. the sputum was much reduced in amount. Congestion and wheezing were often relieved. Appetite and sleep were usually improved. Contrary to the views held by many writers, Crocket does not think that weight was much affected. Kirkwood and many others agree that a noticeable effect is a decrease in the amount of lung moisture. Laird treated 220 pulmonary cases with natural heliotherapy, and used 110 as controls. He thought that the method was of definite use in cases which showed a tendency to fibrosis. Cooper used natural heliotherapy in 134 cases ; 24 of them were in moderately early stages of the disease, and improvement resulted in 41·7 per cent. This result is probably not more marked than would be expected with other methods.

Sorgo[26] of Vienna uses artificial light very cautiously in pulmonary tuberculosis, and he claims that he has good results. These are seen especially in diminution of cough, of sputum and lung moisture, and of pain. Cases which have chronic thickening of the pleura are very suitable. Sorgo agrees that a focal reaction can quite easily be caused by the indiscriminate use of light treatment. He attributes the good results in selected cases to a beneficial effect on the lymph circulation.

The results recently published by Sepke[21] are interesting. He records 400 cases of pulmonary tuberculosis treated with the Bach lamp. These cases were classified according to the Turban-Gerhardt system as follows : Stadium 1, 240 cases ; Stadium 2, 158 cases ; Stadium 3, 2 cases. Of these cases 354 were of the "closed" type, and complications were seen in only 6—viz., hæmoptysis, 2 ; rise of temperature, 4. In these 6 cases treatment was discontinued. In the other 348 cases treatment was carried through, and the author states that the results were generally good, though he points out that it is difficult to decide how far the irradiation was responsible for the improvement. The remaining 46 cases were of the "open" type, and treatment here was experimental. Improvement occurred in 14 cases, but in 9 cases treatment had to be discontinued—in 6 because of a rise of temperature, and in 3 on account of hæmoptysis.

As a general expression of the use of the method on the Continent, the second edition of the work by Birk and Schall, which has just been published, is especially interesting.[27] In the treatment of tuberculosis in children these authors employed artificial light in the following lung conditions : (*a*) Cases of early disease. Fresh air and

sunlight is necessary in these cases, and artificial light is used when sunlight is not available. (*b*) In the treatment of the various forms of perifocal infiltration. The authors consider that, apart from the essential measures of graduated rest and fresh air, little can be done to shorten the course of treatment in these cases. The parents often demand a promise of active measures before they will allow the children to go into an institution, and ultra-violet therapy is a convenient means of providing this. (*c*) Cases of bronchial gland tuberculosis. (*d*) In late cases, solely as a means of "doing something." With the doses used the authors consider that little harm is done. They generally begin with an exposure of two or three minutes at 60 cm., and increase gradually to half an hour. After this dose has been continued for two weeks, treatment is discontinued altogether during another two weeks; thereafter the whole course is commenced over again from the beginning.

General Discussion.

It will be apparent that an extraordinary diversity of opinion exists as to the merits of the treatment. On the one hand it is unfair to neglect entirely the findings of certain competent observers who are convinced that they have had good results in selected cases; but, on the other hand, the dangers of the method must always be borne in mind. Sorgo rightly points out that when a writer says that he has never seen any unfavourable developments *which could be attributed to the treatment*, his bias affects his interpretation of the cause of these symptoms. In this country it is perhaps too readily assumed—very frequently by persons who have had no actual experience of the method—that light treatment is taboo as far as pulmonary tuberculosis is concerned.

The present writer has had some experience of the method in pulmonary cases, and he is in entire disagreement with those authors who state that there are no associated dangers. His experience suggested that in certain carefully chosen cases the treatment certainly was of benefit. In other cases, in which no bad effects were produced, it was difficult to determine whether the improvement was or was not due mainly to the light.

The danger of hæmoptysis has probably been exaggerated. It seems possible that some at least of the hæmorrhages described have been due, not to the action of the ultra-violet light, but to the inhalation of ozone in a badly ventilated treatment room.

The method is deceptive, in that it appears to be easy, whereas it is really very difficult. The difficulties are chiefly two: (1) the estimation of the correct dosage, and (2) the selection of the suitable case. The dosage question can be fairly easily decided; but rules for the selection

of cases will be difficult to enunciate, and the actual selection of the individual case will probably always be a personal matter.

It must be emphasized that the method is not specific. Used as such in definite cases it is almost certain to fail. It should only be employed in pulmonary cases as an adjuvant to the established methods of treatment, and hence it should find no place outside the residential institution.

The present position of the method in this country has been recently summarized by MacNalty.[28] He says: "No conscientious and experienced medical officer will advocate this treatment in any case of pulmonary tuberculosis without careful consideration of the risks involved, and in any event, no case of pulmonary tuberculosis, however mild, should receive the treatment except in a residential institution where constant medical supervision can be exercised. In advanced and febrile cases and in cases liable to hæmoptysis it seems an unjustifiable method of treatment."

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THE USE OF INSULIN IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

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The discovery of insulin by Banting has entirely changed the nutritional problem in the treatment of diabetes. Patients, regardless of their sugar tolerance, can now, with insulin, be fully nourished. The nutritional problem is equally important in pulmonary tuberculosis and allied diseases, such as rheumatoid (toxic) arthritis and exophthalmic goitre, where wasting may be a predominant feature.

In a number of severe forms of phthisis accompanying severe diabetes which have come under my care I have been frequently struck with the fact that the nutritional problem can be so adequately cared for as to yield remarkable progress towards recovery in both diseases.

The appetite induced by the use of insulin in otherwise intractable cases of anorexia has, in certain instances, been most striking, and this has tempted one to make use of insulin in the treatment of pulmonary tuberculosis and allied diseases.[1]

One has been greatly encouraged in this attempt by a search through the literature, which shows that since the discovery of insulin there have been many attempts to make use of it apart from diabetes.[2-26] The results obtained by an American pædiatrician (Marriot[27]) in 1923 in wasting infants encouraged a number of observers to investigate the effects of insulin in a variety of nutritional diseases marked by a lack of nutritional equilibrium.

Harris[28] in 1924 suggested that insulin played an important rôle in the hunger-producing mechanism. His observation was based upon cases of hyperinsulinism, in which the patients suffered from an insatiable hunger. The problem of anorexia in certain cases of phthisis is one which, most observers will admit, may be beset with difficulties and disappointments.

There are a large number of medicaments at the disposal of the practitioner, yet not infrequently we have to admit that they are of no avail, and one sometimes becomes desperate and gives up in despair.

I have found that insulin, in pulmonary tuberculosis, will often combat anorexia where every other measure has failed. In the poorly-nourished patient with little or no appetite and a feeble resistance to disease the use of insulin, in stimulating the appetite, improving the nutrition, and thereby increasing the resistance, becomes a factor of considerable importance.

Where all the usual measures have failed, patients will often be found to eat with a real appetite and gusto if insulin is correctly used. If we can restore the normal appetite, to put it no higher than this, insulin will have achieved its due recognition as a therapeutic measure of no small value. This, in selected cases, it can certainly do. In such cases I have found that the symptoms and physical signs in the lungs are markedly reduced. Moreover, with the increase of weight and resistance the extent of infiltration of the lung parenchyma is reduced, as shown by serial radiograms, and signs of healing are observed. I emphasize "selected" cases, because the indiscriminate use of insulin in phthisis is fraught with danger, and this will, as in the case of many other valuable therapeutic measures, bring it into disrepute. Its indications and contra-indications are well defined, and must be recognized. It is especially indicated in afebrile, inactive cases of phthisis, where failure to gain weight in a previously robust individual persists despite the usual therapeutic measures.

No treatment should be undertaken without clinical, radiological, and bacteriological control. Observations of weight, pulse, blood pressure, and temperature should be made when using insulin.

Among the contra-indications are the following: (1) Fever; (2) active disease; (3) hæmoptysis; (4) marked hypotension; (5) severe reactions following injections.

It has been my practice to commence treatment with a hypodermic injection of 5 units of insulin twenty minutes before the principal meal.

As is the case with diabetics, if the patient is not in an institution he can be taught to give the injection himself into the skin of the thigh or abdomen. This he can very quickly master. To avoid any risk of hypoglycæmia, patients are advised to drink a glass of milk, or take glucose. Patients are advised, as in the case of diabetes, to carry two or three lumps of sugar with them, and should they develop any symptoms of hypoglycæmia, such as general weakness, listlessness, shakiness, palpitating nervousness, giddiness, sweating, etc., to take a lump of sugar. The injection of 5 units is continued daily for the first week. Other things being equal, this is increased by 5 units weekly until 30 units is taken as a daily dose for one to three weeks. I never exceed the 30 units dose.

The larger doses may be divided and taken twice daily twenty minutes before the principal meals, followed three hours later by the milk or glucose. For the larger doses double strength insulin (40 units per c.c., as compared with the normal strength of 20 units per c.c.) may be used more conveniently.

My conclusions may be summarized as follows:

1. The value of insulin as a therapeutic measure in certain selected

cases of phthisis to restore normal appetite and combat loss of weight and resistance is outlined.

2. The systematic use of insulin for all cases of phthisis is not to be encouraged.

3. It must be rigorously limited to inactive and afebrile cases with clinical, radiological, and bacteriological controls.

4. Hæmoptysis, marked hypotension, and marked reactions following the injection contra-indicate its use.

5. The maximum daily dose of 30 units should not be exceeded and should not be continued for more than two to three weeks.

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THE PROBLEM OF THE ADVANCED TUBERCULOUS PATIENT.

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IN dealing with the problem of the advanced case of pulmonary tuberculosis, it is necessary to be quite clear which type of case we are considering. Classification of cases suffering from tuberculosis is difficult and most efforts are open to criticism. I do, however, claim that an advanced case is one in which the progress of the disease cannot be arrested by any form of treatment, thereby including the slowly advancing ambulant case as well as the rapid early one. It can be argued that this definition implies that the case cannot be classified until treatment has been given. Many times this is necessary to determine the prognosis, but in order to overcome this objection the definition might be framed as "the cases which are unlikely to derive material benefit from any form of treatment." By this I am relieved of the necessity of mentioning forms of treatment which, unfortunately, can be only palliative. The main part of this paper will therefore deal with the disposal of the advanced case, but before passing to that problem, I should like to make a few observations on the onset and development of the advanced condition.

The Development of Advanced Tuberculous Disease.

There seems to be a growing impression that many patients are in an advanced stage when they first seek advice. If this be true it is due to either absence of, or the refusal of the patient to acknowledge, the usual symptoms characterizing the onset of the disease. I do not think that there is much reluctance on the part of patients to consult their doctors, and there is little doubt that diagnosis is now more accurate and less delayed than previously. One cannot, however, help

being struck by the frequency of a short history of symptoms accompanying an advanced stage of the disease. Search and question as one may in many cases, the patient insists that he felt perfectly fit until a few months before he first sought advice, but on examination both lungs are involved and excavations present. To account for this either the disease must be rapid in progress or symptoms in the early stages are so mild as to be consistent with normal health. It is not within scope of this paper to discuss these propositions, but I mentioned them to disperse the usual conclusion that an advanced case is necessarily one with a long history of treatment. The sudden discovery of an advanced condition of tuberculosis in a patient who has been previously healthy within a few months of the examination is by no means a rare experience. Having found the advanced case, what are we to do? There are the following possibilities:

1. Allow him to remain at home.

2. Admit him to: (*a*) The tuberculosis ward of the municipal general hospital near to his home; (*b*) a special home for ambulant advanced cases, situated in the country; (*c*) a tuberculosis hospital along with other cases of a moderately but not too advanced condition. In deciding which of these alternatives to follow we must remember that we have two objects in view—(1) to make the patient as comfortable as possible, and (2) to prevent the spread of the infection.

Dangers of the Advanced Case.

An advanced case that is up and about, and does not take precautions to collect and destroy the bacilli in his sputum, will be far more dangerous and spread the infection over a much greater area than one confined to bed, where his activities are localized to one room. Even if such a person is careless, the infection is more or less restricted to the room he occupies. This should be borne in mind when there is a scarcity of institutional beds for tuberculous patients. If possible a case should not be allowed to remain in a house where there is overcrowding, where there are young children, or where there is difficulty in providing the necessary nursing and general attention. On the other hand, unless conditions are very bad, a case likely to die in a few days should be left at home, as any movement is an extreme discomfort to the patient, and often causes expense and difficulties for the relatives. Naturally, everything should be done to help the relatives to nurse the patient, and advice given as to the disposal of infectious material.

Types of Institution.

The type of institution to which the patient should be sent will depend on his condition, and the provision made for advanced cases by the local health authorities.

The advantages of sending the case to the Municipal General Hospital are that the patient can be easily visited by his relatives if dangerously ill, and the cost of treatment and transport will be comparatively low. If some temporary improvement occurs he can be sent to a tuberculosis hospital, which should be situated in rural surroundings on the outskirts of the town.

In the general hospital special wards should be reserved for these cases with as many single-bedded wards as possible, and a few two, four, and six-bedded wards for the less advanced and earlier tuberculous cases. The staff at the hospital would then have the advantage of treating and nursing all types of tuberculosis, and so obtain knowledge which generally has been unobtainable except at a special hospital.

If the patient has a fair prospect of living a year or more—that is to say, if the progress of the disease is slow—he should be sent to a tuberculosis hospital situated near to the largest town of the area to ensure accessibility, and designed to receive such cases along with others not of the advanced type, but those likely to benefit from special treatment, such as collapse therapy in all its various forms.

By admitting to the tuberculosis wards of a general hospital cases in all stages, and to a tuberculosis hospital cases requiring special treatment along with the advanced cases, we obviate many difficulties that arise from grouping all the advanced cases together. This latter course does not work in practice. The hospital or home becomes a house for the dying of a most distressing character, to which the patients refuse to go, and in which staff will not work. There is such a fine border-line between the Stage 2 and Stage 3 cases that there is no reason why they should not be admitted to the same institution.

Whilst the advanced case is in hospital he must be instructed in the precaution he must take to prevent the spread of the infection, because it is possible that some slight temporary improvement in his physical condition will occur, and after a period of from four to six months he will be able to be sent home.

The duration of his stay at the hospital will depend on the number of beds available. Extension of treatment beyond a period of six months will rarely have much effect on the length of life after discharge; it is therefore better to have a large number of advanced cases that have been educated to control their lives and the spread of infection than to segregate permanently a very limited number and give the others only domiciliary treatment. Further, the removal of an advanced case from home, even if it is only for a few months, relieves the domestic strain, and allows preparations to be made for the future.

If the conditions of the patient's home are such that it is undesirable for him to return, then he must be considered as an exceptional case,

and kept at the tuberculosis hospital providing he does not obstruct the admission of a patient who is in need of special treatment. If this is the case, he should be removed to the public assistance hospital near to his home, and remain there until his home conditions can be improved.

The Rôle of the Country Home.

If the patient whose home environment is bad reaches an almost stationary condition, he should be transferred to a country home, where his time should be occupied in some handicraft work. Rural surroundings and occupations often have a remarkable psychological effect in relieving symptoms and stimulating contentment and happiness. In fact, except in the very ill cases, I think all advanced cases should be given some suitable light employment and, if possible, a small remuneration. This makes the man cheerful, and his last years are not blackened by the intense feeling of uselessness accentuated by an enforced inactive existence which leads to moral degeneration and loss of self-respect The length of the patient's sojourn at the country home must be governed by economic factors and the conditions of his home. Let the patient who has children in a small house in a slum area stay at the country home as long as possible, but allow the one with good domestic conditions in a healthy district to return home from the tuberculosis hospital.

General Principles.

The principles controlling the disposal of the patient can be summarized:

1. That as there is no prospect of permanent benefit from treatment it is uneconomical to provide prolonged residential treatment which is mainly of educational value.

2. That advanced cases must not be allowed to occupy beds which are needed for cases in which treatment can give decided and permanent benefit.

3. That except where there are very young children present and there is overcrowding, the educated advanced case can return home with little risk of spreading the infection to others.

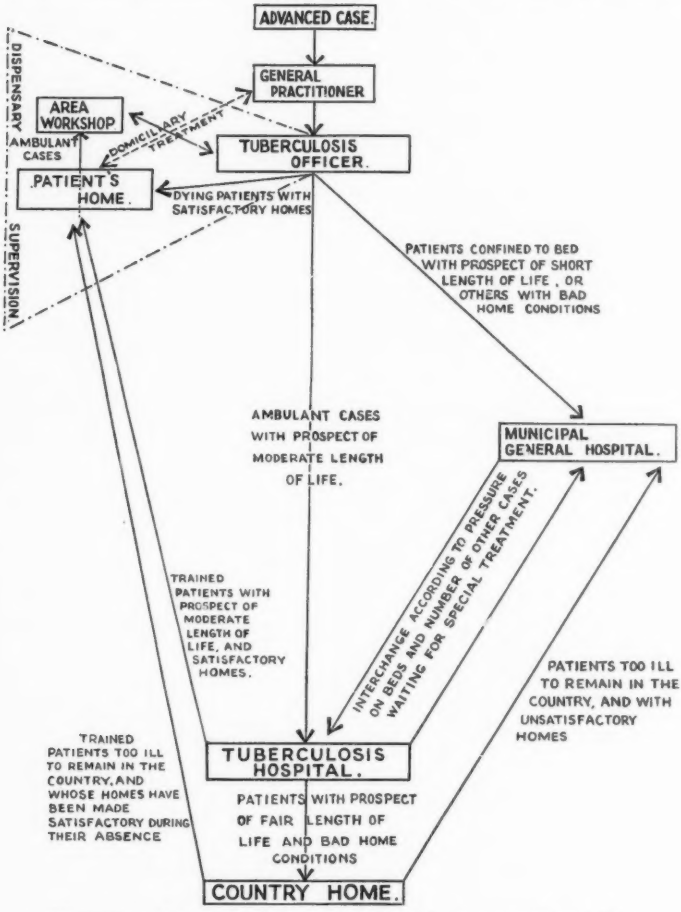
4. That unless there is definite contra-indication on hygienic grounds sentimental factors should be considered in all advanced cases.

5. That the ambulant advanced case should be given light employment with some small remuneration.

In cases where home conditions are bad the ambulant advanced case should be retained at a country home in rural surroundings and given light employment as long as his physical condition allows, and then transferred to an institution as near to his home as possible.

If home conditions are suitable, I would advocate that either handi-

craft work be brought to him at home, or better still a number of small workshops be established, under the supervision of the tuberculosis officer and the health visitors, to which patients from certain limited areas could come and occupy their time in one of the many light pro-


ADVANCED CASE.
GENERAL PRACTITIONER
AREA WORKSHOP
DISPENSARY
AMBULANT CASES
DOMICILIARY TREATMENT
TUBERCULOSIS OFFICER.
PATIENT'S HOME.
SUPERVISION
DYING PATIENTS WITH SATISFACTORY HOMES
PATIENTS CONFINED TO BED WITH PROSPECT OF SHORT LENGTH OF LIFE, OR OTHERS WITH BAD HOME CONDITIONS
AMBULANT CASES WITH PROSPECT OF MODERATE LENGTH OF LIFE.
MUNICIPAL GENERAL HOSPITAL.
INTERCHANGE ACCORDING TO PRESSURE ON BEDS AND NUMBER OF OTHER CASES WAITING FOR SPECIAL TREATMENT.
TRAINED PATIENTS WITH PROSPECT OF MODERATE LENGTH OF LIFE, AND SATISFACTORY HOMES.
PATIENTS TOO ILL TO REMAIN IN THE COUNTRY, AND WITH UNSATISFACTORY HOMES
TRAINED PATIENTS TOO ILL TO REMAIN IN THE COUNTRY, AND WHOSE HOMES HAVE BEEN MADE SATISFACTORY DURING THEIR ABSENCE
TUBERCULOSIS HOSPITAL.
PATIENTS WITH PROSPECT OF FAIR LENGTH OF LIFE AND BAD HOME CONDITIONS
COUNTRY HOME.

Movements of patient to be controlled by T.O. in co-operation with Medical Superintendent of the Institution.

ductive employments that are now being given to similar cases in tuberculosis hospitals and colonies. If the patients were given a small remuneration and possibly a midday meal for their labours, I am sure that the psychological effect upon themselves and their families and their

homes in general would be a tremendous asset. The scheme would not be a financial success, but with proper management it would not be expensive, particularly when it is remembered that it would give much more control over the movement and conduct of the patients, which would tend to eliminate the necessity of periods of institutional treatment at frequent intervals. The above suggestions can be represented in the accompanying diagram.

All who have had advanced cases under their care know that the majority of these patients are only too eager to do something. The area workshop scheme would satisfy this desire before the patient had developed into an idle degenerate who had nothing else to do but lounge about his home, probably annoying his family and often through sheer boredom ending the day at the local public-house.

The advanced case of tuberculosis is living under a death sentence. Let us try to help him and his family in every possible way to escape from realizing it. Many patients and homes, by such a scheme, could be given months of happiness in their tragic misfortune.

CRITICAL SURVEY.

TUBERCULOSIS AND HEREDITY.

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The influence of hereditary factors upon the development of tuberculous disease in human beings is a subject which has always had a certain importance for the physician and which has never failed to arouse the interest of the lay public. The widespread conviction on the part of the latter as to the hereditary nature of the disease is apparent in the almost indignant protest with which a diagnosis of phthisis is not infrequently greeted. This is expressed in the well-known complaint on the part of the parents or other relatives of the young adult in whom the evidence of manifest disease of the lungs has been discovered for the first time, "We can't think how he can have got it, doctor, there's never been anything of the sort in our family." The task of explaining the state of affairs to the patient and his relations is never an enviable one, and the difficulty of replying to questions on the subject of heredity is none the easier in view of the difference of opinion which has been evident on the part of the medical profession at different periods in the last century. There is, perhaps, no question on which it is less easy to make an *ex cathedra* pronouncement. From the purely scientific standpoint it cannot be said that there is any real ground for regarding tuberculosis as an inherited disease, and yet one must admit that a conviction which is so deeply rooted in the public mind should not be immediately dismissed as wholly baseless. Perhaps the truth, as in so many cases, lies somewhere between the two extremes.

From the medical standpoint we can but examine the evidence, so far as it goes, which is afforded by the pathological and clinical data that we possess. Discussion on a question of this kind necessarily hinges very largely upon statistical enquiry. It is impossible in a résumé such as this to enter at any length into a detailed consideration of complicated figures. For an example of reliable literature I would refer readers to Professor Karl Pearson's[2] commentary, published twenty-five years ago, and to his replies to some of his American critics.[3] One fact of which there appears to be little doubt is that true congenital tuberculosis is such a rarity that it may be regarded as negligible. The number of instances recorded in medical literature of

the transmission of the tubercle bacillus *in utero* is extremely small, and such cases as have been quoted may be regarded as having no practical bearing upon the problem of phthisiogenesis. Of greater significance is the study of family history in relation to the development of active tuberculosis, but it is here that the interpretation of figures is so difficult and the sources of error so many.

An interesting and instructive paper was recently published by Struthers,[7] who in a discussion of "the significance of the so-called hereditary factor, by which is understood the inheritance of a predisposition or lack of immunity to tuberculosis," gave the following table showing the number of instances of a familial incidence of pulmonary tuberculosis in a series of cases investigated.

TABLE INDICATING THE FAMILIAL INCIDENCE OF PULMONARY TUBERCULOSIS.

Relatives of	Father.	Mother.	Father and Mother.	Father Only.	Mother Only.	One Brother or One Sister.	One Other Relative.	Two or more Relatives other than Father or Mother.
195 cases, sputum T.B. +	17	13	2	12	5	16	11	13
51 cases, sputum T.B. –	8	1	1	7	2	7	5	3

At first sight the hereditary factor might appear to be considerably in evidence, but Struthers, like many other writers, points out the fallacy of concluding that this factor is at work without taking into account that of infection, due to environment.

A similar observation was made by Squire[4] at the British Congress of Tuberculosis, when he expressed the view that "the direct influence of heredity in tuberculosis is considerably less than was formerly supposed." In an earlier communication to the Royal Medical and Chirurgical Society[6] and also in the *American Journal*[5] Squire notes that he found that 33 per cent. of consumptives presented a family history of tuberculosis, but he considered that there were good statistical grounds for attributing the disease in the majority of these cases to occupation and surroundings, and he estimated the possible influence of heredity at about 9 per cent. instead of 33 per cent. An interesting confirmation of this estimate is furnished by his examination of 469 insurance claims, during which he found that the excess in the percentage of deaths from tuberculosis in those with a consumptive family history over deaths from this disease in those without direct hereditary predisposition was 8 per cent., a curious approximation to the 9 per cent. quoted in his two previous memoranda.

The position regarded from the aspect of medical statistics is perhaps best summarized in the paper read to the Fellows of the Royal Society of Medicine by the late Dr. Arthur Latham,[1] who pointed out some of the chief fallacies of most statistical tables on this subject. Nearly all of them, he said, were based on comparatively small figures; moreover they depended on answers obtained from individuals as to the cause of death or the occurrence of tuberculosis in their relatives or ancestors; such data were extremely unreliable. Further, most of the family histories collected on such hearsay evidence were incomplete. He says: "Our knowledge of the influence of heredity upon tuberculosis is not precise. We know that transmission of the tubercle bacillus from parent to child *in utero* is more common than was at one time supposed, but that it is so rare that it is a negligible factor. . . . The parts played by infection and environment are important when we come to the question whether persons who suffer from tuberculosis transmit a predisposition to this disease because it is impossible to say whether these two factors have been given their true value in the various investigations made on this subject."

So much for the more theoretical aspects of the matter. The above references do not, of course, represent more than a fraction of the literature, but they are perhaps sufficient to illustrate the main lines on which statistical investigation has been conducted, and to serve as examples of the kind of argument which has been put forward. It must, however, be admitted that in most questions of practical medicine there is nearly always a feeling that even the most carefully prepared figures, properly corrected and interpreted by experts, cannot render all sides of the truth. However uncertain, from a strictly scientific point of view, may be the influence of hereditary legacies in relation to the development of tuberculous disease in young adults, experienced clinicians, dealing with large numbers of phthisical patients, can hardly doubt that the family history is a factor of some degree of importance. What then is to be said as to its significance? How far can it legitimately be taken into account in forming an opinion as to the predisposing causes of the occurrence of the young adult type of phthisis, and what influence, if any, may it be said to have upon the question of prognosis? So far as the majority of cases go, I do not think that one's opinion should be influenced very much by the average family history, either in the matter of causation or indeed in the matter of prognosis. It has already been observed that most of the family histories obtained are incomplete and that many are inaccurate. There are in all probability few families in whose genealogy, if it could only be traced far enough, one would not find instances of the occurrence of tuberculosis in one form or another in individual members, and this is precisely the point upon which the average patient is almost invariably

either extremely vague or else resentfully positive in defence of the reputation of his stock. There are, however, many cases in the practice of every physician for diseases of the chest in which the family history is notoriously bad. A mother, for example, will bring three or four daughters in succession to the consulting-room or the hospital, with the same story of the development of characteristic symptoms during adolescence or early adult life in a girl who during childhood has been comparatively healthy. It is difficult, to my mind, to avoid the suggestion in such cases that the hereditary factor is a dominant one, and I often feel on this account a more serious anxiety in regard to the prospects of the last comer. I have in mind examples of various families in which several children have died in early adult life from one of the more acute types of pulmonary tuberculosis, and in which a single survivor has been brought for examination, it may be after an interval of some years from the death of the first. I am, of course, well aware that the question of direct infection between contacts is one which is bound to be raised here, and that the possibility of exogenous re-infection cannot easily be set aside; all the same, in view of our comparative ignorance of the exact phenomena which underlie the sudden manifestation of infiltration of the lung parenchyma with tuberculous inflammatory products, and having regard to the practical impossibility of gauging the date or the intensity of actual infection with any constancy or by any accurate scientific standard, I feel that there is in these circumstances at least a good deal of presumptive evidence of some hereditary predisposition.

It can hardly be denied that a definite hereditary transmission of physical peculiarity occurs in the case of various allergic diseases such as migraine, urticaria, and the different forms of asthmatic syndrome. There is here no consideration of any congenital infection *in utero*; the question of infection does not arise, except possibly as an end-factor which may determine the precipitance of an attack. One is dealing with a certain instability of a neuro-muscular mechanism of the body which is essentially a characteristic handed on, in accordance with hereditary laws, by the patient's progenitors. I cannot help feeling that there is at least some analogy between the case of such allergics and that of adult individuals in a family who, although living in good surroundings and not subject to any of the obvious predisposing causes, are suddenly stricken by the acuter forms of consumption. This suggestion appears all the more substantial when we remember how little we really know of the bio-chemistry of the human body, and how infinite are the potentialities in regard to physical and mental characteristics in general that are conveyed by the chromosomes. Moreover, the influence of hereditary traits as a determining factor, not only in the initial manifestation, but also in the subsequent development of

phthisis, is further suggested by our practical inability to foresee with any approach to certainty the course of disease in two individuals who display similar clinical pictures at the onset of their illness, and who are treated under the same or under strictly comparable conditions. Why, it is constantly asked, does A do well under whatever régime he has been treated, while B, who has been placed in the best possible environment and provided with every adjunct to treatment that modern knowledge can supply, goes downhill from the very start?

Whatever may be the biological factors which underlie the essential difference between these individuals, it can hardly be doubted, in the face of clinical experience, that such factors are present, and that they determine the physical make-up which constitutes the patient's individuality. The longer I have studied the clinical aspects of adult tuberculosis, the more have I become convinced that the key to the problem, if it is ever found, will be found not in the seed, but in the soil, and I believe that many physicians who are concerned with the treatment of these patients will probably agree with this view. How far heredity in the sense of an inherited susceptibility can be reckoned with as a practical proposition it is difficult to estimate; the correct assessment of the factors of heredity and infection is at present a question which cannot be subjected to any exact criteria, but must remain largely a matter of impression based upon individual experience. My own feeling as a clinician, which I give for what it may be worth, is that the inheritance on the part of phthisical patients of a physical make-up which renders their immunity to tuberculosis less than that of other more fortunate individuals is a probability which gains a good deal of support from a study of the behaviour of the disease in all its practical aspects. I would venture to suggest that if, as we are encouraged to believe, the development of our knowledge of biochemical problems enables us in the future to form a more accurate concept of what is really meant by immunity, the hypothesis which I have outlined in regard to the significance of heredity in tuberculosis will begin to appear in a much closer relation to the ascertained facts.

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For various other references to the subject see also:

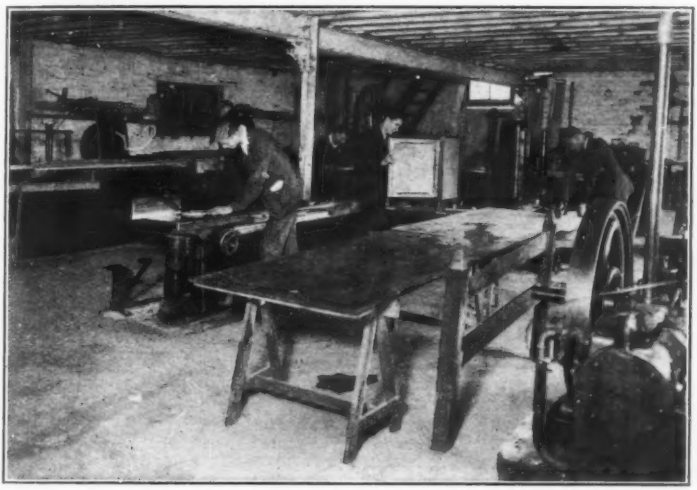
FISHBERG, M.: "Pulmonary Tuberculosis," 2nd edit., Philad. and N.Y., chap. iv.

ASSOCIATIONS AND INSTITUTIONS.

WRENBURY HALL TUBERCULOSIS COLONY.

We have received from Dr. H. V. Cantor, House Physician of the above institution, the following description:

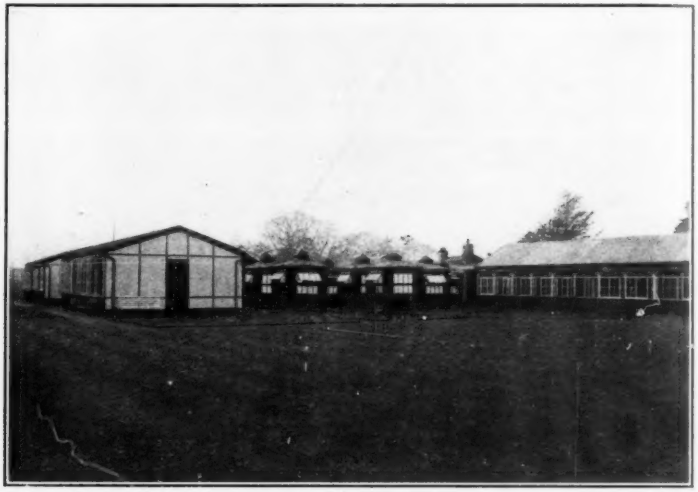
Wrenbury Hall Tuberculosis Colony, near Nantwich, Cheshire, was established in 1922 as a memorial to the men who had fallen in the Great War by the Cheshire branches of the British Red Cross Society



WRENBURY HALL TUBERCULOSIS COLONY: THE WOOD-WORK MACHINERY SHOP.

and the Order of St. John of Jerusalem. Since its foundation the institution has been controlled by the Cheshire County Council as part of their tuberculosis scheme. For some years past the colony has been receiving convalescent male patients from the Cheshire Joint Sanatorium, thus relieving the pressure on the waiting list at that and other institutions, and at the same time providing suitable and graduated work for convalescent patients, until they are once again able to take their place in the outside world as bread-winners. There is accommodation for fifty patients in four comfortable wards of ten beds each and in châlets. The beds are arranged along one side only of the wards, and each pair is separated from the rest by partitions. A beginning has been made in the creation of a village settlement by the permanent colonization of eight men. This number will shortly be increased. The

industries carried on comprise: (1) Wood-working. All kinds of portable buildings are made, including châlets, garages, and poultry-houses. The workshops are well equipped with fine up-to-date machinery. Extensive improvements are at present being made to this department, which will add to the comfort of the men and to the efficiency of their work. (2) Poultry-farming, which is providing suitable work for settlers and patients, and financially has been very successful. There is a good pedigree stock of healthy blood-tested birds, and a large



WRENBURY HALL TUBERCULOSIS COLONY: WARDS AND CHÂLETS.

trade is done in eggs for breeding and in day-old chickens. (3) Market-gardening Flowers, fruit, bedding-out flowering and vegetable plants, tomatoes, and all kinds of vegetables are marketed. The market garden comprises nine acres of land, including three acres of orchard. (4) Brush-making. This is the newest of the Wrenbury Hall industries, and has developed into a profitable enterprise. The men like the work and are turning out brooms and brushes of high quality. Among old brush-makers there is a belief that the fumes from hot pitch are beneficial to the lungs and that the trade is consequently suitable to tuberculous individuals.

NOTICES OF BOOKS.

COLLAPSE THERAPY IN PULMONARY TUBERCULOSIS.

Dr. A. Bernard has written a monograph on the treatment of pulmonary tuberculosis under home conditions by artificial pneumothorax: it is an enthusiastic recommendation of this form of therapy.[1] It should prove of special interest to readers in this country, where, in spite of the considerable amount of pneumothorax work done in London and in most of the well-known British sanatoria, the value of the treatment does not even now appear to have received adequate recognition by the rank and file of the medical profession. This is not to say that the induction of an artificial pneumothorax is to be regarded as in any sense a substitute for the general principles of treatment which should guide us in the management of phthisical patients, and we note with satisfaction that Dr. Bernard emphasizes this important point from the very outset. The book covers with great care the whole of the ground, and the author has omitted no details that would serve to make his treatise as complete as possible. At the same time his descriptions are concise and his arguments easy to appreciate, and the value of what he has written is considerably enhanced by the numerous skiagrams, for the excellent reproduction of which the publishers are deserving of no little congratulation. In his views as to the indications and contra-indications for artificial pneumothorax treatment, as well as in his description of technique and of the various complications and sequelæ that are associated with this form of therapy, Dr. Bernard has followed the lines adopted by most workers experienced in this branch of medicine, and we have little to say in the way of comment. One criticism we would venture to make. It is that in his advocacy of the early induction of a pneumothorax in pulmonary abscess and hydatid disease of the lung his attitude is a bolder one than we should ourselves have dared to adopt without much greater qualification, even in cases where drainage through a bronchus is already in progress. The treatment of such conditions is notoriously a matter of great difficulty, and one on which considerable doubt and difference of opinion still exist among physicians and surgeons who are working in collaboration. Not a few instances are known of disastrous results of pneumothorax treatment applied to cases of intrathoracic suppuration. In our view this particular question is still very far from solution, and a great deal more trenchant criticism will have to be faced by both physicians and surgeons before we shall be able to look with satisfaction upon our records of the end-results of these cases. So far as our own experience goes, we are inclined to think that the number of cases of pulmonary tuberculosis which are really suitable for pneumothorax therapy has been greatly overestimated by many exponents of the treatment. It is, however, undoubtedly true that there are many patients whose lives

[1] "Le Pneumothorax Thérapeutique Ambulatoire (Le Vade-Mecum du Praticien Phtisiologue)." By Adolphe Bernard, and Preface by Professor Rieux. Pp. 222, with 14 figs. and 21 plates. Paris: G. Doin et Cie, 8, Place de l'Odéon. 1932. Price 45 frs.

might have been considerably prolonged, if not saved, by a more timely use of this valuable adjunct to our general management of the disease, and we congratulate Dr. Bernard on his courageous desire to increase the number of those who should benefit by artificial pneumothorax therapy, of the essentials of which he has given us in this well-arranged volume such an admirable account.

MAURICE DAVIDSON, M.D., F.R.C.P.

ARTIFICIAL PNEUMOTHORAX.

Dr. L. S. T. Burrell has provided in the excellent "Practitioner's Series" of handbooks a concise, explicit, practical guide to the conduct of collapse-therapy by means of the production of artificial pneumothorax.[1] The work is intended for the general practitioner and admirably meets his needs. Dr. Burrell has not sought to write an elaborate monograph on his subject, but to set forth essentials in a direct, matter-of-fact way. His directions for selection of cases, technique, and general management are based on his own extensive experience. It is emphasized that the carrying out of artificial pneumothorax is a therapeutic measure which usually should be combined with other forms of treatment such as general rest, climatic control, phrenic evulsion, and administration of gold or other preparations. After a brief introduction the various forms of apparatus and their use are fully described, and then follow chapters on indications and contra-indications, refills, intrapleural pressure, the effects of artificial pneumothorax on the lungs and circulation and complications. There are also separate chapters on bilateral artificial pneumothorax and selective collapse, surgical methods, radiology and termination of treatment. Such an enumeration will indicate the wide scope and practical character of Dr. Burrell's serviceable work. It should convince the general practitioner of the value of artificial pneumothorax in properly selected cases as a valuable adjunct to other methods of treatment. The volume is provided with a select bibliography. There is a series of instructive skiagrams and other figures. Certainly Dr. Burrell has rendered the general practitioner a notable service by the issue of this common-sense manual, and it should be added that tuberculosis officers, medical superintendents of hospitals and sanatoria, and other specialists in the management of tuberculous subjects, will find much in these pages which will be suggestive and helpful.

A LIFE OF ROBERT KOCH.

We have received an interesting and timely publication from Leipzig, being the first volume of a biography of Robert Koch by Professor Bruno Heymann: it covers the period 1843-1882. It forms part of a notable series entitled, "Great Men: Studies in the Biology of Genius."[2] We learn of Koch's early life and restricted means, his

[1] "Artificial Pneumothorax." By L. S. T. Burrell, M.A., M.D., F.R.C.P., Physician to the Royal Free Hospital and to Brompton Hospital for Consumption and Diseases of the Chest, etc. Pp. vii + 174, with 13 figs. and 12 skiagrams. London: William Heinemann (Medical Books), Ltd., 99, Great Russell Street, W.C. 1. 1932. Price 12s. 6d.

[2] "Robert Koch: I. Teil, 1843-1882." By Professor Bruno Heymann. Leipzig: Akademische Verlagsgesellschaft m.b.H. 1932. Price unbound 16 M., bound 18 M.

parents' self-sacrifice in insisting on his adopting a medical career and making it possible for him to commence at Göttingen University, of his success there, and his later decision to take up general practice rather than follow an academic calling. In spite of his busy life Koch carried out at Wollstein his famous investigations by which he proved the definite association of the anthrax bacillus with the disease. Much light is thrown on Koch's mental activity and inventiveness by the inclusion of many of his letters with facsimiles. Perhaps the most interesting portion of the volume is that which gives a full account of Koch's lecture at Berlin in 1882, where he gave a graphic description of his discovery of the tubercle bacillus, and his proof of its causal connection with tuberculosis. Professor Heymann was himself present at this lecture.

C. A. Dunbar Mitchell, M.A., A.I.C.

FRENCH AND GERMAN WORKS ON TUBERCULOSIS.

Professor M. Loeper, in the first part of the book written by himself and his colleagues, gives an interesting account of the non-tuberculous diseases of the lung.[1] The second part consists of twelve chapters by different authors, and deals with the treatment of pulmonary tuberculosis. The chapter devoted to BCG., describing the experimental results of the inoculations and the pros and cons of this method of prevention, is of special interest in view of the controversy which this subject has caused. Artificial pneumothorax, surgical treatment, drugs, climate and sanatorium régime each have a chapter contributed by a well-known author. Those who have collaborated in the production of this work are to be congratulated, for they have produced a volume which deals fully with treatment, a subject much neglected in the mass of medical literature. The book will be a valuable addition to the library of anyone interested in diseases of the lung. It is vol. iv. of the series of "Thérapeutique Médicale."

L. S. T. Burrell, M.D., F.R.C.P.

Drs. Nègre and Boquet have found that by treating tubercle bacilli with methyl alcohol instead of ethyl alcohol and acetone they obtained an extract which they call "antigène méthylique."[2] This, they state, stimulates the formation of tuberculous antibodies. They do not claim to have found a cure for tuberculosis, but experiments with guinea-pigs and rabbits show that these animals treated by the antigène resist tuberculous infection better than the controls. The results of treating tuberculosis in man are encouraging, and detailed accounts are given of cases of tuberculosis not only of the lung, but of all forms of tuberculosis treated by this method. The experiments and cases are fully described, and the book, which is the result of much careful and painstaking work, can be thoroughly recommended. There is an introduction by

[1] "Poumons et Tuberculose." By M. Loeper, L. Tanon, R. Turpin, Léon Bernard, L. Nègre and A. Boquet, E. Rist, E. Sergent, H. Busquet, P. Halbron, A. Courcoux, Ch. Richet fils, L. Guinard, M. Villaret. Pp. 378. Paris: Masson et Cie, 20, Boulevard Saint-Germain. 1932. Price 50 frs.

[2] "Le Traitement de la Tuberculose par l'Antigène Méthylique (Antigénothérapie)." By Drs. L. Nègre and A. Boquet, Chefs du Service à l'Institut Pasteur. With Preface by Professor Calmette. Pp. 236. Paris: Masson et Cie. 1932. Price 35 frs.

Dr. Léon Bernard and a preface by Professor Calmette, and at the end a full list of references.

L. S. T. BURRELL, M.D., F.R.C.P.

After Sicard and Forestier described the value of lipiodol in radiological examination, it was used for every conceivable disease of the lungs. Tuberculous and bronchiectatic cavities treated with lipiodol gave striking pictures. In carcinoma of the bronchus, abscess of lung and other conditions, lipiodol was used not only for diagnosis, but to help localize the disease. As time passed it was realized that the practical value of lipiodol was limited, and that to demonstrate a large cavity was of no advantage to the patient. Dr. Poumeau-Delille, in his book, describes in detail the uses of lipiodol in the diagnosis of bronchial dilatation, and discusses the pathology and treatment of bronchiectasis [1] A résumé of forty-eight cases is given to illustrate different cases in which lipiodol was found helpful. The book is well illustrated, and contains a full list of references

L. S. T. BURRELL, M D., F.R.C.P.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Dr. Harley Williams has provided an excellent general survey of the evolution of public health measures in this land during the past hundred years.[2] The work is timely, has been well planned, and has been effectively carried out. Professor Jameson in his commendatory Foreword justly says that Dr. Williams' book will be read with pleasure and with profit by all students of social medicine. It is certainly a work which should be available for all who are engaged in any form of enterprise making for advancement in public health and personal hygiene. The author has addressed his volume to Medical Officers of Health and to the many Councillors and lay members of committees who now are responsible for the regulation of measures directing preventive medicine in this country. The work is appropriately dedicated to Sir Robert Philip. Some idea of the aim and scope of Dr. Williams' instructive and stimulating book will be indicated by an enumeration of the seven parts, each of which includes a series of special chapters: The Rise of the Medical Services; Infectious Diseases; From Coercion to Prevention; The Development of Anti-Tuberculosis Work in Britain; Child Life and Health; The Control of Venereal Diseases; Smallpox and its Lessons; and The Architects of Social Medicine. Readers of this *Journal* will be specially interested in the author's excellent survey of the organization and administration of measures seeking the prevention and arrest of tuberculosis. This account of tuberculosis services is set forth in a series of thirteen interesting chapters, including special sections on The Tuberculosis Dispensary, The Astor Committee, Tuberculosis after the War, Care-work, Bovine Tuberculosis, and Problems of the Milk Supply. Dr. Harley Williams,

[1] "La Remaniement Nosologique de la Dilatation des Bronches par l'application systématique du Lipiodo-Diagnostic." By Poumeau-Delille. Preface by Professor Sergent. Pp. 132, with 27 figs. in text. Paris: Masson et Cie. 1932. Price 24 frs.

[2] "A Century of Public Health in Britain, 1832-1929." By J. H. Harley Williams, M D., D P.H. With a Foreword by W. W. Jameson, M.D., F.R.C.P., Professor of Public Health in the University of London. Pp. xv + 314. London: A. and C. Black, 4-6, Soho Square, W. 1. 1932. Price 7s. 6d.

as Medical Commissioner to the National Association for the Prevention of Tuberculosis, has enjoyed exceptional opportunities for presenting educational benefits to the general public in an acceptable and practical form, and his chapters relating to the tuberculosis problem merit the serious consideration of all engaged in anti-tuberculosis work. We anticipate a wide field of useful service for Dr. Williams' opportune volume.

Dr. Henry Sigerist is Professor of the History of Medicine and Director of the Institute of Medical History at the University of Leipzig and has served as a visiting lecturer at Johns Hopkins University. His famous work, "Einführung in die Medizin," has been translated into a number of languages, and now Miss Margaret Galt Boise has provided an excellent version in graceful English.[1] Professor W. H. Welch testifies in his sympathetic Foreword to the unique character of the volume. It is the work of a master in the history of medicine and a scientist "with penetrating insight into the past and present social, cultural and philosophical bearings of the doctrines and practice of the healing art." Such an exposition should be read by every student and practitioner of medicine. The author has succeeded in his aim "to picture the whole structure of medicine in the frame of general culture." It is a book which all thoughtful laymen may read with pleasure and profit. The volume opens with a fine study of the structure, functions and mind and spirit of man, and then follow chapters on The Sick Man and The Signs of Disease. The development of the conceptions and general theories of disease are effectively presented, and are followed by sections on The Study of Special Diseases, The Course of Disease, and The Incidence of Disease and Mortality. Causes of disease are discussed, and then comes a study of medical aid. The closing chapter is devoted to an exposition of the aims and work of the true physician. The volume contains suggestive references to tuberculosis.

Dr. W. Kerr Russell's monograph on Colonic Irrigation will be of interest and service to all medical advisers.[2] The clyster has had a long history and occupied a prominent place in the therapeutic measures of the seventeenth and eighteenth centuries, and now again colonic lavage is coming into favour. After historical, anatomical, and physiological introductions and an exposition of the flora and parasites of the intestine, the various forms of apparatus used in colonic lavage are described and illustrated, and methods of application are explained. There are chapters on the physiological effects of colonic lavage, contra-indications and possible dangers, and conditions in which the treatment has proved beneficial. The author shows that in tuberculous peritonitis colonic irrigation with hot solutions will often relieve pain. There is a select bibliography. A word of praise must be given to the publishers for the admirable form in which the book is produced.

[1] "Man and Medicine: An Introduction to Medical Knowledge." By Dr. Henry E. Sigerist. With an Introduction by Dr. William H. Welch, Professor of the History of Medicine in the Johns Hopkins University. Pp. x+340. London: George Allen and Unwin, Ltd. 1932. Price 12s. 6d.

[2] "Colonic Irrigation." By W. Kerr Russell, M.D., B.S., Medical Officer-in-Charge, Light and Electrical Departments, Miller General Hospital for South-East London, etc. Pp. viii+191, with 28 illustrations. Edinburgh: E. and S. Livingstone, 16 and 17, Teviot Place. 1932. Price 10s. 6d. net.

Sir Charles Close, formerly Director-General of the Ordnance Survey, has written a charming book about England, which we warmly commend to the attention of members of the medical profession, and all health and holiday seekers and every lover of maps.[1] The author in graceful English sets forth the history of our Ordnance Survey, and affords interesting facts regarding old maps of England. Then follow chapters on the Reading of Maps, Place-Names, Prehistoric, Roman, and Saxon England, with notes on Elizabethan times and seventeenth-century England. This work should appeal to all Englishmen, and we hope it may find a place in schools, sanatoria, and in places where hikers, cyclists, motorists, and other lovers of England's country-ways are to be found. It is a delightful gift book for invalids and general readers interested in the history, geography, and archæology of our homeland. The book is effectively got up, with pleasing illustrations and maps.

Dr. Bolton Tomson has published a thoughtful brochure, which is addressed specially to members of Tuberculosis Care Committees.[2] He seeks to present the milk problem from the standpoint of those who are most in need of a pure and first-rate milk supply, the tuberculous, and more especially the poverty-stricken and those living under bad conditions, who suffer from malnutrition, and consequently are liable to fall victims to tuberculosis. Dr. Tomson is a believer in the pasteurization of milk used for human consumption wherever it is practically possible. His brochure is clearly the outcome of much thought and investigation, and deserves unprejudiced consideration.

The Central Bureau of Hospital Information is rendering a notable service by the annual issue of "The Hospitals Year Book."[3] The 1932 issue has undergone thorough revision and has been brought up to date. It is an indispensable work of reference. Every hospital and all connected with, or interested in, hospital affairs should possess a copy. Sir Arthur Stanley provides a commendatory foreword and Sir Charles Harris furnishes a financial review. There is also a general survey of the work and finances of the voluntary hospitals in Great Britain and Ireland and other important articles, including one by Sir Alexander K. Butterworth on road accidents. Much valuable statistical data is presented in fifty-three ably compiled tables. There is an excellent table summarizing the work, finances, and staff of sanatoria. An excellent index is available.

[1] "The Map of England, or About England with an Ordnance Map." By Colonel Sir Charles Close, K.B.E., C.B, C.M.G, Sc.D., F.R.S. Pp. x+166, with 8 illustrations. London: Peter Davies, Ltd., 30, Henrietta Street, W.C. 2. 1932. Price 6s.

[2] "Fluid Milk in its Relations to the Tuberculous and Tuberculosis Care Committees." By W. Bolton Tomson, M.D., Medical Superintendent of the "Sea-View" Sanatorium, St. Leonards-on-Sea, etc. Pp. 48. London: Baillière, Tindall and Cox. 1932. Price 2s.

[3] "The Hospitals Year Book, 1932: An Annual Record of the Hospitals of Great Britain and Ireland." Issued under the auspices of the British Hospitals Association and the Joint Council of the Order of St. John and the British Red Cross Society. Editor, R. H. P. Orde, B.A.; Sub-Editor, A. E. Ceadel, F.S.S. Pp. xlix+268. London: Central Bureau of Hospital Information, 12, Grosvenor Crescent, S.W. 1. 1932. Price 7s. 6d.

PREPARATIONS AND APPLIANCES.

HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

THE "EVER READY" HEAD LAMP.

THE EVER READY HEAD LAMP is No. 2292 in the admirable series of electric lamps bearing the general designation "Ever Ready."[1] It is an equipment which every doctor should possess. For use in clinical work, for dealing with motor difficulties and for all forms of work where an effective light for inspection is necessary, this novel, compact, reliable and inexpensive lamp is to be commended. The whole outfit is easily carried in a convenient case. The lamp is fixed to the head, and leaves both hands free for action. The battery is contained in a nickel-plated holder which is hooked to pocket or belt. (The price of the lamp is 7s. 6d. complete; with case 3s. 6d. extra.)

THE "SWAN" FOUNTAIN PEN holds a foremost place among indispensable pocket companions valued by doctors, nurses, patients, and indeed all who have to put pen to paper.[2] It is interesting to note that the signatories of the powers participating in the Lausanne Agreement used a "Swan," and on other historic occasions this type of pen has found favour. This serviceable fountain pen is in every way designed and constructed to meet such requirements as the busy doctor desires. It is available in a series of forms and sizes, and fitted with different kinds of nibs, so that all tastes can be met. We would particularly commend a "Swan" for the use of patients in hospitals, sanatoria, nursing homes, and elsewhere.

THE GLUCATOR is a novel outfit providing for the rapid and accurate quantitative estimation of sugar in a patient's urine.[3] Enclosed in a portable case are test tubes, reagents, pipette, etc., with brochure and colour-table giving particulars regarding technique. This equipment will be of service to the busy practitioner and to the tuberculosis officer

[1] The "Ever Ready" Head Lamp is supplied by the Portable Electric Light Company, Ltd., 120, Shaftesbury Avenue, W. 1.

[2] Particulars regarding "Swan" Pens can be obtained on application to Mabie, Todd and Co., Ltd., Swan House, 133 and 135, Oxford Street, W. 1.

[3] Particulars regarding the "Glucator" can be obtained from H. K. Napp, Ltd., 3 and 4, Clement's Inn, W.C. 2

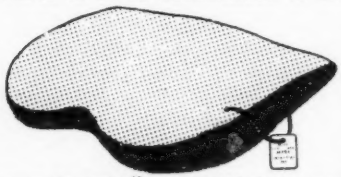
especially when engaged in domiciliary visits. (The price complete with reagent is 10s. 6d. post free.)

THE SCROLL FLOWER HOLDER should be available wherever table decorations with fresh and beautiful flowers are appreciated.[1] Not only in private houses, but in hospitals, sanatoria and nursing homes the new flower holder should be available. It is a simple, ingenious, mechanical contrivance consisting of a heavy glass base with holes into which fit the scroll-constructed supports, which are coloured green, and by means of which the flowers can be artistically arranged. This novelty of British design and manufacture only needs to be seen and used to be approved. (The price is 2s. 6d.)

THE IDEAL ONE-HANDED SPRAYER is a novel appliance for the distribution of disinfectants and insecticides which can be readily operated with one hand, leaving the other one free for manipulation.[2] The medicated fluid is ejected in a fine mist-like spray which is penetrating and effective. The sprayer is made of brass, nickel-plated or with polished lacquer. (The price of the nickel-plated sprayer with capacity of $\frac{3}{4}$ pint is 3s. 11d.)

THE "SPIROMOL" ALL-GLASS INHALER is a serviceable apparatus whereby medicated vapours may be applied to the nasal passages, throat, bronchi and lungs, and so is of service in many cases of pulmonary and laryngeal tuberculosis and other affections.[3] It is constructed entirely of glass, and all inspired air passes through the medicated liquid before reaching the respiratory passages. A series of "spiromol" solutions are available for use with the inhaler. (The price is 3s.)

THE SOXOS KNEELING CUSHION is a novelty of a practical nature which is to be commended to all who in the dwelling-house, office, workshop, garden, or elsewhere undertake duties requiring a kneeling position.[4] We would specially commend it to the attention of patients living the open-air life who are engaged in horticultural activities. The cushion may be used for many purposes, including that of hassock in church service, seat rest for invalids and others, and general protection from damp, rough or irritating surfaces. This serviceable and durable appliance consists of real sponge rubber suitably shaped, and is of British manufacture. The size is $12\frac{1}{2}'' \times 9'' \times 1\frac{3}{4}''$. (The price is 3s. 6d.)



THE "SOXOS" KNEELING CUSHION.

THE RUSHTON CURVED DENTURE BRUSH should be known and used by all wearers of artificial teeth.[5] The brush is so shaped as to fit into the nooks and crannies of a dental plate, with strong, durable,

[1] Particulars and illustrations of the Scroll Flower Holder and Stand can be obtained from the inventor, A. Rossiter, 60, Wellington Street, and Stuart Street, Luton, Beds.

[2] Particulars regarding the varieties of the Ideal Sprayer can be obtained from Ernest Hupfield, 12, Holborn Viaduct, E.C. 1.

[3] The "Spiromol" All-Glass Inhaler is supplied by Allen and Hanburys.

[4] The Soxos Kneeling Cushion is made by Thornley and Booth, Ltd., Boston Mills, Hyde, Cheshire.

[5] The manufacturers are the Rushton Curved Denture Brush Company, Broad Oak, Venn Grove, Hartley, Plymouth.

efficient bristles which have been sterilized and are firmly fixed into the handle. All tuberculous patients wearing dentures should be taught to clean them thoroughly, for the preservation of oral hygiene is a matter of first importance. (The price is 2s.)

THE "AGATE" CLEANSER is a special form of powder compound prepared for the cleansing and preserving of porcelain enamel surfaces such as occur in baths and other sanitary equipments met with in kitchens and elsewhere.[1] It can also be employed for the rapid cleaning of china and cooking utensils. It is easy to use and is very effective, and is also inexpensive.

Under the general designation of CUSI DERMOSES have been introduced a fine series of scientifically designed and skilfully prepared ointments and pastes for the treatment of all varieties of skin disease.[2] We have received specimens of these elegant and therapeutically effective agents for local application, and can strongly recommend them to the consideration of medical advisers dealing with cutaneous disorders. Particulars regarding the individual preparations are given in a special brochure, a copy of which can be obtained on application. Each form of the Cusi Dermoses is put up in convenient collapsible metal tubes so that the contents can be kept in perfect condition anywhere and over long periods. Some of these Dermoses will be found of service in dealing with the skin troubles not infrequently met with in tuberculous subjects.

Scrubb's CLOUDY and PERFUMED AMMONIA are preparations which have justly won wide popularity.[3] The former is a hygienic agent useful for a number of purposes, including toilet measures, softening of hard water, removal of grease-marks and stains and general cleansing. The Perfumed Ammonia makes a delightful addition to the bath. We would also commend Scrubb's Antiseptic Toilet Soap, which is fragrant, refreshing and an effective cleanser for the most sensitive of skins.

"FELSOL," which for long has been approved in the treatment of certain cases of asthma, angina pectoris and other spasmodic affections, has lately been found to be helpful in relieving the dyspnœa met with in some cases of pulmonary tuberculosis.[4] "Felsol" consists of phenazonum of the B.P. together with other approved agents, and the results which have followed its use in advanced phthisis seem to indicate that if properly used this agent will be valuable in ameliorating the cyanosis and dyspnœa met with in certain cases of extensive tuberculosis of the lungs.

THE "TOINOCO" HYGIENIC HANDKERCHIEFS are ideal forms of paper fabric for use not only in hospitals, sanatoria, open-air schools, nursing homes, and other institutions, but in connection with service in a doctor's consulting-room and for the use of all classes of patients.[5] They are of special advantage in cases of pulmonary tuberculosis and

[1] The "Agate" Cleanser is supplied by Ewart and Son, Ltd., 346-350, Euston Road, N.W. 1.

[2] The Cusi Dermoses are manufactured in the Laboratorios del Norte de Españo, Masnou, Barcelona, and specimens and particulars can be obtained on application to James W. Michael, 6, Springfield Square, Bishopbriggs, Glasgow.

[3] Scrubb's Ammonia Preparations, Soaps and other hygienic specialities are manufactured by Scrubb and Co., Ltd., Glasshouse Street, Lambeth, S.E. 11.

[4] Particulars regarding Felsol may be obtained on application to the British Felsol Company, Ltd., 15, Caroline Street, W.C. 1.

[5] The "Toinoco" Specialities are manufactured by the Toinoco Handkerchief Company, Ltd., 55, Hatton Gardens, E.C. 1.

other chest cases, and should be employed wherever "catarrhal" conditions and other infectious diseases have to be dealt with. These sanitary specialities are of English manufacture. They are aseptic, medicated, non-odorous, absorbent, of soft silky texture, free from dust, pleasant to use, produce no local irritation, and can be readily destroyed after use. They are available in several qualities, forms, and sizes. (The price ranges from 1s. to 2s. per 50.)

VITALAST RUBBER SHEETING will be of service in hospitals, sanatoria, nursing homes, and elsewhere.[1] It is made by a new patent process from latex rubber, and can be washed and sterilized. It is strong and durable, warm to the touch, of silk-like texture, and can be employed in the tropics. Moreover, it lies flat without rucking or creasing, and is resistant to urine, acids, and most antiseptics.

CLAROCIT is a novel and serviceable preparation for use with spectacles and other glasses worn by doctors, motorists, sportsmen, and others who have to work exposed to rain, steam, and fog, and for application to motor windscreens and other glass surfaces.[2] It is also useful for keeping the surface of laryngeal mirrors and other optical instruments clear. By the use of Clarocit condensation of moisture obstructing vision is prevented. We specially commend this preparation to the attention of members of the medical profession. (Clarocit is available in three sizes—at 1s, 2s. 6d., and 5s.)

Tooth-brushes are essential agents in the maintenance of oral hygiene and the prevention of dental decay. An admirable form of CHILDREN'S TOOTH-BRUSH has been introduced by Messrs. Page and Kaye, Ltd., and are available at a price so low—3d. each—that they can be supplied gratuitously or at a nominal charge through hospitals, dental clinics, child welfare centres, and schools.[3] These tooth-brushes are convenient in size, form, and weight for the use of children; the bristles are of excellent quality, and are firmly fixed in coloured celluloid handles, which can be readily kept clean. It may be noted here that the manufacturers supply a larger size for adults attending ante-natal clinics, tuberculosis dispensaries, and other centres.

PINE TAR AND OLIVE OIL SHAMPOOS are excellent cosmetic preparations for cleansing the scalp and preserving the hair.[4] The Packer method of shampooing, begotten of over seventy years' experience, if carried out with the Packer shampoos, gives excellent results. These hygienic appliances are not only admirable for the fit, but are excellent for delicate and disordered subjects in whom evidences of hair deterioration frequently occur.

BRONCO PERFORATED TOILET PAPER, made in Great Britain, is a sanitary speciality which can be recommended on grounds of hygiene, economy, domestic efficiency and personal comfort.[5] The paper is guaranteed free from deleterious constituents.

[1] Vitalast Rubber Sheeting is supplied by Chas. F. Thackray, Park Street, Leeds.

[2] Clarocit is supplied by the Clarocit Company, Ltd., 110, Great Portland Street, W. 1.

[3] Full particulars regarding the new tooth-brushes for children may be obtained from Page and Kaye, Ltd, 18, Bartlett's Buildings, Holborn, E.C. 4.

[4] Particulars regarding the Packer Shampoos can be obtained from J. C. Gambles and Co, Ltd., 211-215, Blackfriars Road, S.E. 1.

[5] Bronco Perforated Toilet Paper is supplied by the British Patent Perforated Paper Company, Ltd., Atlas Works, Berkshire Road, Hackney Wick, E. 9.

THE OUTLOOK.

THE TUBERCULOSIS PROBLEM.

THE Annual Report of the Ministry of Health is always a mine of information and suggestion regarding matters relating to the health of the nation. The last issue deals with international health work and general health questions, sanitary administration and health services, and the Local Government Act of 1929.[1] There is a valuable section on housing and town planning, and this is followed by sections on local government and local finance, administration of the Poor Law and National Health Insurance and contributory pensions. A special section is devoted to the work of the Welsh Board of Health. Readers of this journal will be specially interested in the data relating to tuberculosis. The statistical returns are of much interest. These show that on December 31, 1931, there were in all 20,909 beds available for the treatment of tuberculous subjects in institutions belonging to local authorities in England. This number is composed of (*a*) 17,764 beds in 245 sanatoria and hospitals which have been approved by the Minister for the treatment of tuberculosis (including 1,547 beds in 37 former Poor Law hospitals which have been appropriated as general hospitals under the Public Health Acts or the Local Government Acts); (*b*) 315 beds in 10 former Poor Law hospitals which have been similarly appropriated, but which the Minister has not yet been asked to approve for the treatment of tuberculosis; and (*c*) 2,830 beds in 190 Poor Law institutions, irrespective of beds in such institutions which are not definitely allocated for the treatment of tuberculosis, but are used for the purpose as occasion demands. In addition, 8,254 were available or in use for the treatment of tuberculosis in approved institutions belonging to voluntary bodies. Thus the number of beds in approved institutions was 26,018 on December 31, 1931, as compared with 24,578 on December 31, 1930. On December 31, 1931, the number of approved tuberculosis dispensaries was 462, excluding out-patient departments of general hospitals and clinics approved for certain special forms of treatment only. A table indicates the various classes of approved residential institutions. The last revised list of approved sanatoria and other residential institutions for the treatment of persons suffering from tuberculosis, and resident in England and Wales, was published in June, 1931. A table shows the work done by the Tuberculosis Dispensary Service during each of the last five years. There is also a table summarizing the use made of residential institutions during the year 1931. Other data are set forth in tabular form, including one table which indicates that, at the end of 1931, 337,521 cases of tuberculosis were on the registers of notification kept by medical officers of health in England and Wales. The deaths of tuberculous cases in England and Wales in 1931 numbered 29,658 pulmonary and 6,160 non-pulmonary. Reference is also made to the admirable "Report on

[1] "Thirteenth Annual Report of the Ministry of Health, 1931-32." Pp. xii + 320. London: H.M. Stationery Office. 1932. Price 5s.

Tuberculosis," prepared by Dr. A. S. MacNalty, and noticed in our last number.

Sir George Newman's latest Annual Report is as usual a treasury of statistical and other data, and a fount of inspiration to all engaged in furthering the public health.[1] The report opens with an introduction on the State of the Public Health in England, and then follow chapters on Maternity and Child Welfare, the Insurance Medical Service, General Epidemiology, Tuberculosis, Cancer, Rheumatic Diseases, Venereal Diseases, Surveys of the Public Health Services, the Relation of Food to Health and Disease and Medical Intelligence, Environmental Hygiene and International Health, closing with a summary chapter of Conclusions. Readers of this JOURNAL should make a point of studying the section dealing with tuberculosis. Sir George Newman provides an instructive survey, and pays fitting homage to the researches of Koch: "The light of Koch's wisdom shines over the anti-tuberculosis work of the nations, and nowhere more brightly than in this country. In 1882, when Koch discovered the tubercle bacillus, the standardized death-rate per million living (persons) from pulmonary tuberculosis in England and Wales was 1,945. In 1930 it had fallen to 685, a reduction which is due in no small measure to Koch's work." The number of deaths from all forms of tuberculosis certified in England and Wales during 1931 was 35,818 as compared with 35,745 in 1930. The report insists on the importance of notification in relation to the examination of tuberculous contacts. It is pointed out that available knowledge seems to show that the human type of the tubercle bacillus is responsible for 70 per cent. of the mortality in children from tuberculous meningitis, 60 per cent. from tuberculosis of bones and joints, and 20 per cent. from abdominal tuberculosis. A section is devoted to the discussion of the value of the tuberculin test. An informing account is presented of the progress of tuberculosis schemes, and particularly the work of the dispensary service and observation and treatment in residential institutions. Reference is made to the new village settlement at Gobowen, near Oswestry, now in course of development. There is also a section on artificial light treatment. Several pages are devoted to a consideration of salt-free diets in the treatment of tuberculosis, with special reference to the observations of Dr. E. H. A. Pask, who has studied the subject at Gerson's clinic at Cassel and at Professor A. Hermannsdorfer's clinics at Berlin. Dr. Pask's conclusions deserve reproduction here: (1) "A trial in this country of the Gerson or Hermannsdorfer diets for the treatment of tuberculosis is not recommended, because it is doubtful whether patients would benefit thereby. There is no evidence that, even if the diet were completely adopted, there would be a perceptible improvement in the results of sanatorium treatment. (2) A special kitchen is necessary in which to prepare the diet; such a kitchen would have to be built and equipped with special apparatus at considerable expense. (3) The cost of the food is 30 per cent. higher than that of ordinary food used in a sanatorium, and additional and expensive staff would be required in its preparation. (4) The diet is not a pleasant one to take, and is likely to be objected to by English

[1] "On the State of the Public Health: Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1931." Pp. 259. London: H.M. Stationery Office. 1932. Price 4s.

patients." It is stated that it was not considered desirable to institute a special trial of the dietetic treatment in English sanatoria. Sir George Newman's stimulating report closes with the following inspiring words: "Never before have the English people enjoyed the measure of national health which they have today. Its advancement is one of the duties and hopes of the mother of Parliaments; it is one of the privileged offices of the profession of medicine; it is the current news and good news of public opinion. Not less is it the splendid endeavour and desire of the people themselves. They may have it and hold it, if it be their will."

NOTES AND RECORDS.

The National Association for the Prevention of Tuberculosis has issued the Report of the Council to the Thirty-third General Meeting of Members on July 22 in handsome pamphlet form with an excellent frontispiece-portrait of the Prince of Wales, its President. The aims of the Association are set forth, and tables are given indicating the decline in the death-rate in all forms of tuberculosis. Pictures are given illustrating life at the Burrow Hill Sanatorium Colony. Information is given respecting the activities of the Association, together with a list of lantern slides which may be hired.

The recently-issued Report of the School Medical Officer of the London County Council for 1931, bearing the name of Sir F. N. Kay Menzies, contains statistical and other information regarding the health of London's school children (price 1s. 6d.). The number of elementary school children inspected in the three statutory age groups (entrants, children aged eight and children aged twelve) was 180,245. The grand total of inspections amounted to 336,444. The report states that sixty-six children were notified with pulmonary tuberculosis, and sixty-four had other forms of tuberculosis non-active. The numbers were fewer than those of the previous year. The incidence of tuberculosis in any form found at routine inspections is about one child in a thousand. A section is devoted to open-air education.

The King Edward VII. Welsh National Memorial Association, the headquarters of which are at Memorial Offices, Westgate Street, Cardiff, has issued its Twentieth Annual Report as an impressive volume of nearly 200 pages with names of Members of Council, officers and medical staff, detailed records provided by Dr. D. A. Powell, the Principal Medical Officer, a report by Professor S. Lyle Cummins as Director of Research, and reports from the medical officer of each sanatorium and area, together with several valuable studies and various memoranda, tables, illustrations and coloured map—a truly fine production on which all who have participated must be congratulated.

The Annual Report of the National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis contains Dr. Spurrier's Medical Report for 1931 regarding the work of the sanatorium at Benenden, Kent, where the average number of beds occupied is returned as 139·45.

In connection with the Winter Course of free public lectures given at the Royal Institute of Public Health, 23, Queen Square, W.C. 1, on Wednesday, December 7, at 4 p.m., Sir Pendrill Varrier-Jones, M.A., M.R.C.P., will deliver a lantern lecture on "The Prevention of Tuberculosis."

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T. N. KELYNACK, M.D.

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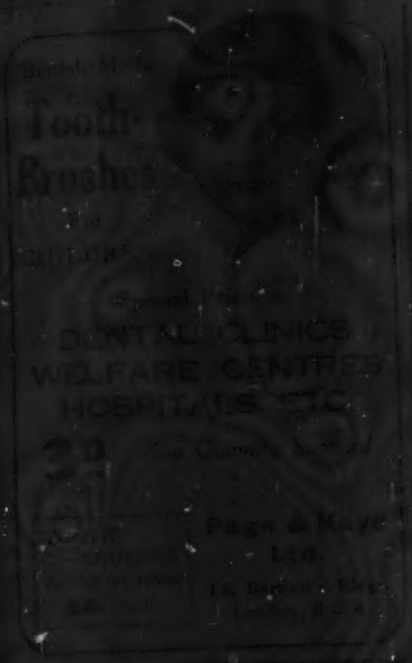

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